A CHILTON PUBLICATION

the Iron Age

NATIONAL METALWORKING WEEKLY

JUN 12 1953

June 11, 1953

EAST ENGINEERING LIBRARY

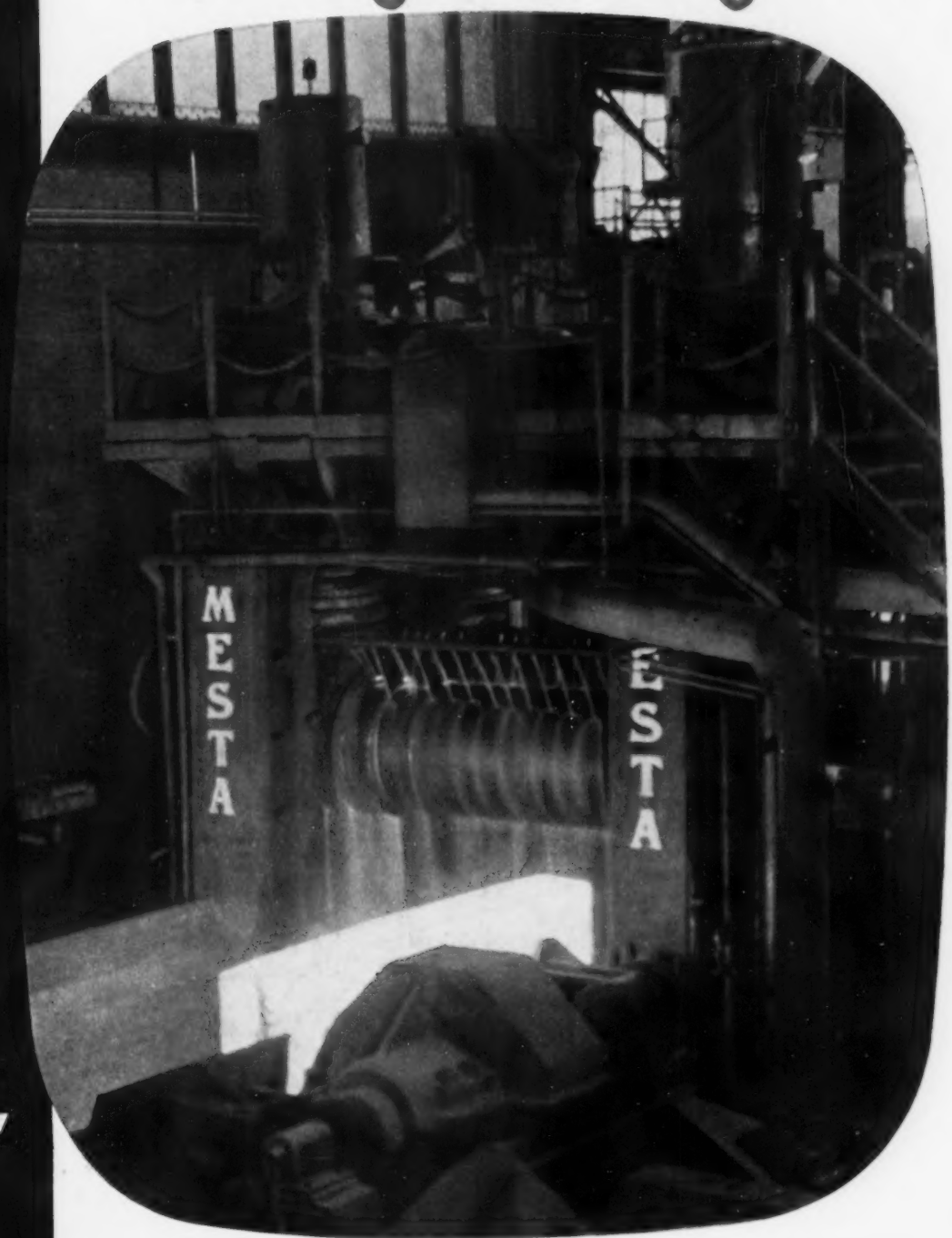
TS PAGE 2

Designed and Built by

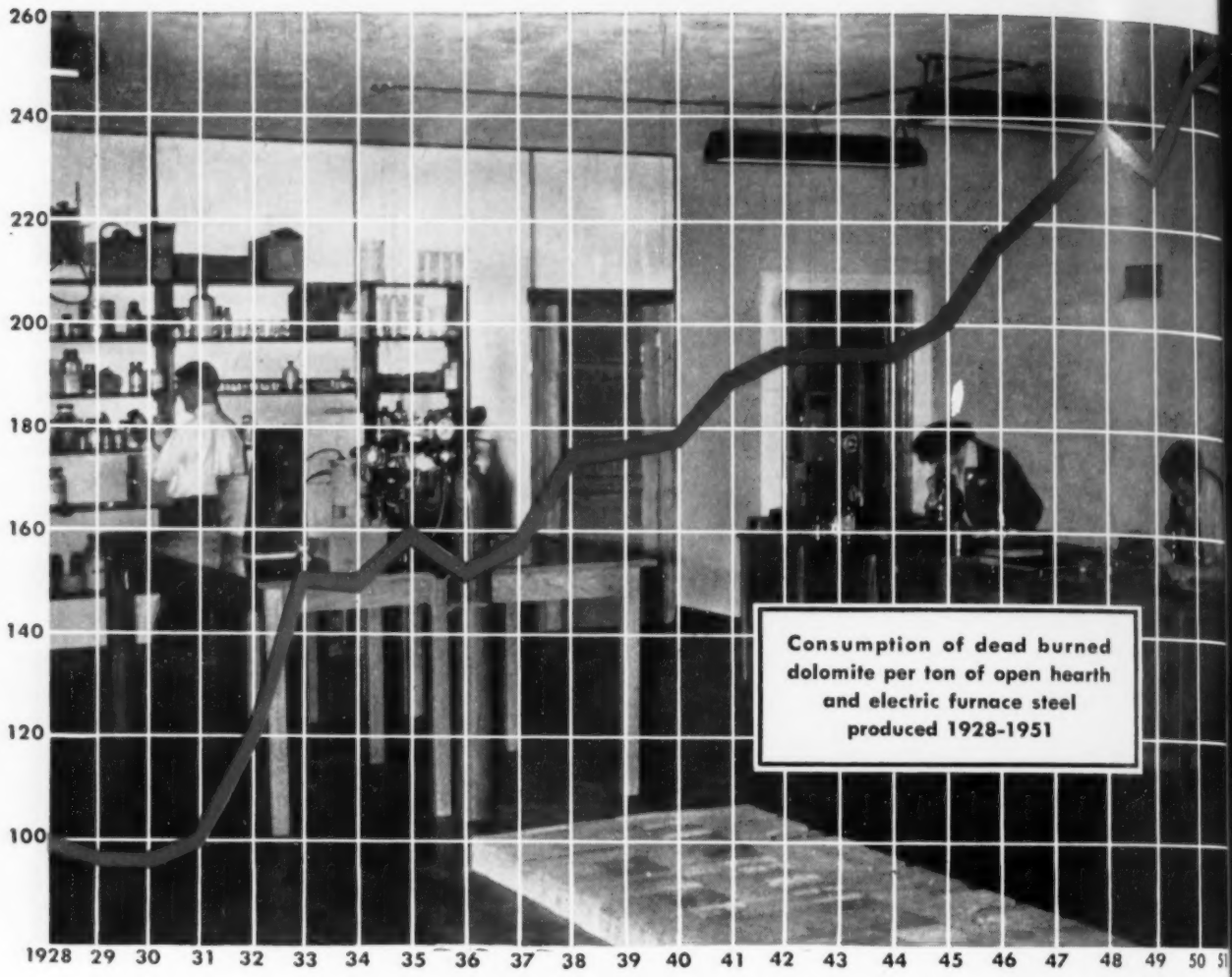
MESTA

MACHINE COMPANY, PITTSBURGH, PA.

Modern Reversing Slabbing-Blooming Mills



MESTA 46" REVERSING SLABBING-BLOOMING MILL



quality standards in dead burned dolomite

WHEN introduced as a substitute for Austrian magnesite during World War I, dead burned dolomite usually contained excessive and uncontrolled amounts of silica, alumina and iron oxide. It left much to be desired as a refractory. To determine standards for an ideal refractory and to correct weaknesses in this pioneer product, Basic Refractories in 1922 established a research and development program.

Investigations established the reactions that refractories undergo in contact with basic open hearth slags. These findings, supported by studies of the thermochemical reactions involved in making dead burned dolomite, made it possible to set definite standards of quality, leading to continuous product improvement.

Today, the most dependable dead burned dolomites provide a maximum of the refractory oxides, crystalline lime (CaO) and periclase (MgO), with just enough calcium ferrites and silicates to provide rapid setting in the furnace hearth. The crystalline lime component performs an important function in resisting siliceous slags formed in the early stages of a heat, while the periclase component has excellent resistance to the corrosive action of the basic slag formed later.

Manufactured to standards designed to satisfy actual conditions inside the furnace, dead burned dolomite has become America's preferred maintenance refractory—dependable in performance, low in cost, and plentiful in supply. Magnefer and Syndolag, trade names synonymous with quality in dead burned dolomite, can bring these benefits to every open hearth and electric steel producer. They are available in increased tonnages due to completion of our third major plant expansion in ten years.

Basic Refractories Incorporated

845 HANNA BUILDING, CLEVELAND 15, OHIO

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Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

In the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

INTRODUCING BEARCAT TOOL STEEL

Super Shock-Resisting ...Versatile, Too!

Here's a brand-new tool steel that we've been developing over the past several years. Proven in a wide variety of production tools and dies, Bearcat is a general-purpose steel especially suited for uses where shock-resistance, hot-work properties and easy machining are important.

Some of Bearcat's big features:

- Super shock-resistance
- Deep-hardening . . . in air
- Easy to machine (Brinell 197 max)
- Low distortion in heat-treatment
- Good hot-work properties
- Easily carburized for long wear

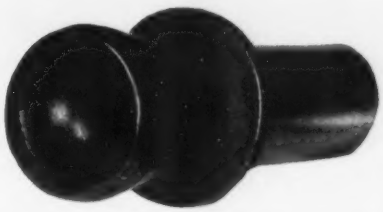
These are not just claims made for a new, untried steel! Bearcat has been thoroughly tested in applications such as rivet sets, hot gripper dies, punches, chisels, moil points, forming dies. All of the possible uses for Bearcat have not yet been explored, but we expect it to be ideal for hot headers, blanking dies, master hobs, machined-cavity molds, and many general-purpose tools and dies.

Bearcat is stocked in our mill depot and it's also available through your local Bethlehem tool steel distributor.

Typical analysis:

C	Mn	Si	Cr	Mo
.50	.70	.27	3.25	1.40

Complete data may be had by writing us for Booklet 341. Address your request to Room 1037, Publications Dept., Bethlehem Steel Co., Bethlehem, Pa.



BEARCAT DRIVES 27 TIMES MORE HOT RIVETS

Here's one example of what Bearcat can do on a job that calls for both shock-resistance and good hot-work properties. This typical rivet set, made from Bearcat, drove 43,094 rivets and was still in good condition. Rivet sets made from carbon tool steel, and used under similar conditions, drove an average of only 1566 rivets before recupping was required.

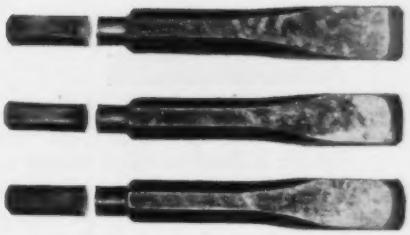
THE BETHLEHEM TOOL STEEL ENGINEER SAYS:

High-Carbon Tool Steels Can Be Carburized

Many people don't realize that carburizing can be accomplished with the high-carbon, high-chromium steels—such as our Lehigh H, which contains 1.55 pct carbon and 11.50 pct chromium. The carburizing of tools made from such steels can be either helpful or harmful, depending upon whether the carburized case is produced intentionally or accidentally.

Tools intended for light loads and long service, such as lamination dies, are often intentionally carburized before quenching. Such dies have greatly improved resistance to wear because of the carbon added to the wearing surfaces. The usual procedure is to use carburizing compound as a packing medium and heat for the normal length of time at the quenching temperature.

Sometimes an accidental carburized case results when "spent" carburizer is used as a protective packing medium when heating for hardening. Spent carburizer is often almost as active as new carburizer. An accidentally produced carburized case is not always harmful. It may even be helpful. But there are many heavy-duty tools and dies that will develop chipped or spalled edges if they become carburized. When treating tools of this type, use cast-iron chips as a packing medium during hardening.



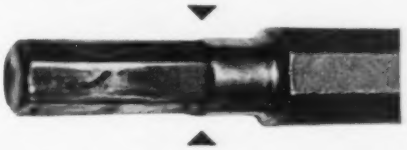
All of the chisels broke in service at the sharp change of section. While this is classed as a mechanical error, it does show how improper design can cause failure no matter how carefully a tool may be heat-treated.

Chisel Breakage Cured by Undercutting Shanks

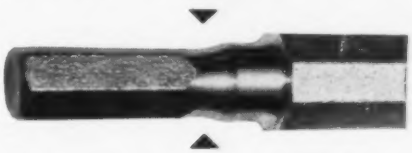
A large user of chisels—made from a top-grade shock-resisting steel, Bethlehem Omega — reported excessive breakage. One of our metallurgical sleuths soon put his finger on the trouble.

When the hexagon shanks were milled by the customer, a milling cutter was used which did not have an adequate radius. As a result, stresses were concentrated at the sharp change of section in the shank. Subjected to heavy impacts in air hammers, the chisels broke prematurely—and always at this portion of the shank.

The solution for the breakage was one that really surprised the customer. See photographs below.



This shank shows the "stress raiser," caused by the lack of sufficient radius, where the milled hexagon section meets the round section.



All of the unused chisels were salvaged by having an undercut ground on the shanks so that a ½-in. radius was provided at the source of the trouble. Despite the smaller section, these chisels gave good service. The sharp change in section was eliminated, stresses were better distributed.

The Iron Age

Vol. 171, No. 24, June 11, 1953

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DIGEST of

NEWS DEVELOPMENTS

HOW MUCH DAMAGE BY INDUSTRIAL NOISE?—P. 55
Loss of earning power is not the sole criterion nowadays for compensation cases. Industrial deafness will be paid for by industry. Some plants with average noise levels are considered safe. Others with high noise levels must take steps. What to do and when to do it. How noise is kept alive and built up.

METAL CLADDERS EXPAND TO MEET NEW USES—P. 58
Although tonnagewise production of clad metals is small compared with other steel products, they are one of the fastest growing segments of the steel industry. Improved production methods have increased applications, and increases in capacity are in the works. Price is an important advantage.

IS ELECTRIC HEAT WORTH THE EXTRA COST?—P. 61
Partisans of electric heating industry claim advantages of fast response, adaptability and efficiency outweigh the higher cost of power equipment. Although the industry has expanded into all branches of metalworking, American Institute of Electrical Engineers believes electric heating may still be in its infancy.

MACHINE TOOL BUILDERS NEED SANE POLICY—P. 62
Producers of machine tools believe their wild feast-or-famine cycles could be flattened out by a middle-of-the-road policy. Feeling is that it's possible—but not easy. One executive sums it up with: Keep your machines up to date, find what the customer needs, then sell it to him.

MANUFACTURERS FIGHT FOR FREER RADIO USE—P. 68
Committee representing 70 manufacturing companies asks Federal Communications Commission to ease ruling governing use of dispatcher-driver radio communication. At present radio control cannot be used if trucks are on public property. Case histories show time, money lost because of this regulation.

TRADE TAXES 'MUSTS' ON CONGRESS DOCKET—P. 77
Congressmen have set adjournment date and must hurry to process most important legislation. Although the excess profits tax extension and tariff bills have been made "musts," some other measures such as St. Lawrence Seaway may go into the legislative scrap pile. Rail rate bill has been slowed.

the Week in Metalworking

ENGINEERING & PRODUCTION

CHEMICAL PLATE GIVES HARD NICKEL COAT—P. 115
Nickel plating by chemical reaction can now be controlled to produce hard, adherent deposits on a variety of metals. Process requires no electric current or anodes. Hence, no problems in throwing power. Intricate and irregular shapes can be plated uniformly. Heat treatment improves the deposit.

PORTABLE BELT GRINDING CAN CUT COSTS—P. 120
You can get greater flexibility at lower cost in off-hand grinding operations with portable belt grinding. Metal removal is more rapid. In many operations a finish grind is not necessary. A specially serrated rubber contact wheel acts like a milling cutter to give a curled metal chip.

COLD EXTRUSION INDUSTRY NEEDS GROW — P. 124
Cold extrusion of steel is fast pressuring its way into competition with standard fabricating methods. Wider use of this process will increase demand for special equipment. Experts disagree on whether the mechanical or hydraulic press yields best results. Need more data on heat treatment.

USE TITANIUM TO DESULFURIZE STEEL—P. 126
A national defense emergency could bring wider use of titanium as a desulfurizer of steel. While it is three times as effective as manganese in this respect, present use is excluded by high cost. Average openhearth grades require 3.6 lb of contained titanium per ton or 7.8 lb of manganese per ton.

RESIN LININGS FOR CONTAINER PROTECTION—P. 129
Wider use of steel drums, pails and cans for the food, special oils and chemical industries lies ahead. Drum linings formulated from the new epoxy resins offer unusual resistance to chemical attack. The new linings are nontoxic and withstand cracking, denting, scratching. Use of rebuilt drums grows.

NEXT WEEK—NEW STAINLESS FILLS INDUSTRY NEED
High corrosion resistance, hardenability and machinability in the quench-annealed condition are virtues of the new V2B stainless alloy. Corrosion and erosion resistance, plus the metal's nongalling characteristics, have suggested use for valve disks, pump impellers, gears and other wear parts.

MARKETS & PRICES

SALES DIP DOESN'T WORRY INSTRUMENT MEN—P. 63
A 23 pct dropoff in first quarter 1953 sales still keeps instrument business over 1951 levels. And the industry has confidence in the future. Lack of industrial atomic piles didn't stop the development of instruments for the purpose. ODM adds $55 million to its $45 million expansion goal.

EUROPE'S STEELMAKERS EYE EXPORT MARKETS—P. 67
Fearing that they may soon have too much steelmaking capacity West European steelmen hope export markets will be able to absorb excess. ECE report indicates steady increase in demand from underdeveloped countries. Commission warns exporters to base steel prices on production costs, not on demand.

AUTOMAKERS CAUGHT IN PRICE-COST SQUEEZE—P. 72
Despite record output and earnings, automakers are caught in the middle between rising costs and the public's demands for lower prices. Some have cut prices, and others are granting discounts off list. Dealers are complaining bitterly despite good margins. Materials and wages have already gone up, and the auto industry fears another steel price increase.

TOOL BUYERS RETURN TO INSTALLMENT PLAN—P. 82
Defense cutbacks and stiffening civilian competition will force an increase in pay-as-you-go buying of machine tools. Manufacturers will have to buy new equipment to meet competition but will buy on installment basis in order to keep cash reserves high. Gear sales in April jumped up 37 pct from the March level.

PEACE IN KOREA WON'T TRIM STEEL DEMAND—P. 149
A cease fire in Korea will have no immediate effect on steel demand. Defense program is firmly set, at least for this year, and will continue even if fighting stops. But it may have psychological effect on buyers for civilian goods industries. Wage talks are still a pivotal issue in steel demand.

LOWER OUR ALUMINUM STOCKPILING SIGHTS—P. 152
It's off again—but only in quantity. Aluminum producers have convinced ODM that demand is surging ahead too rapidly to allow heavy stockpiling without hurting civilian producers. April output beats March Daily Rate. M-16 is revoked, ending many restrictions on copper and copper scrap.

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Look at the map. Every pin locates an Airco plant producing high-purity oxygen for your use. These 71 plants, plus their storage facilities and their fleet of delivery trucks, provide a dependable and flexible supply for your peak and emergency oxygen needs.

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Indexed in the Industrial Arts Index and the Engineering Index.

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National Business Publications

No Time for Jitters

SOME businessmen have the idea that defense spending and the war in Korea have been the main support of our economic life. A few have said this in public; many more have said it in private. They have been aided and abetted in this half-truth by economic experts, crackpots and crystal gazers.

Neither Korea nor the defense program is the major reason for current good business conditions. Here are a few others:

¶ Elimination of controls which returned business to a free market with supply and demand controlling the economy.

¶ Courage of auto and appliance companies who took a big gamble on the country's future and ability to buy.

¶ Full employment, good savings and a desire for new and better products.

¶ Population growth, with buying patterns somewhat different than those of 20 years ago.

¶ Installment buying is heavy and will be heavier. There is no cause for alarm here.

¶ A friendly administration for business—first in 20 years. This generates confidence and planning for the future.

¶ Cut in taxes and waste would mean more can be spent for industry's products. It should mean a healthier civilian economy.

The 62 million U. S. wage and salaried workers have no particular fear of a depression now. If enough people in high places shout "Run for the hills!" they might stop spending wages, savings and credit for the so-called better life.

Heavy defense spending will be with us for a long time. If we really want to do something about preventing a depression instead of talking ourselves into one here is a simple formula:

Make new and better products which will cut costs so a reasonable price structure can be maintained; eliminate obsolete machines and other equipment; have a sales staff which can sell snowballs in the winter; end the negative attitude of waiting-for-the-lightning-to-strike; support a strong country with a defense program capable of backing up our beliefs.

Tom Campbell

Editor

CONTINUOUS OPERATION at any speed

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with

the new *Totally-Enclosed Dual-Cooled* PATENT APPLIED FOR **motor**

For continuous operation over extremely wide speed ranges . . . or wherever unusually severe operating conditions must be met . . . the new Reliance Totally-Enclosed Dual-Cooled Motor extends the application range of the V★S Drive. Wherever high ambient temperatures, intermittent operation, prolonged low-speed operation, or severe duty cycles pose difficult cooling problems, Reliance V★S Drive with Dual-Cooled Motors have proved to be the best answer. The new Dual-Cooled Motor is available either totally-enclosed or explosion-proof, conforming to Bureau of Mines and Underwriters' specifications, in ratings from 15 through 150 hp. D-1464

GET THESE FACTS NOW!

Your request for Bulletin C-2201 will bring you this new booklet featuring large cutaway drawing with 3-color transparent overlay showing operation of Reliance Dual-Cooled Motor, together with fact-filled bulletin showing production increases and operating economies obtainable with Reliance V★S Drive.

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Dear Editor:

Letters from readers

Low-Shaft Furnace

Sir:

I want to say what a good job you did in editing and arranging the material on the International Low-Shaft Blast Furnace Project, which appeared in your May 21 issue.

Would it be possible to obtain about ten copies of this article?

C. H. LORIG
Battelle Memorial Institute
Columbus, Ohio

Alumina From Clay

Sir:

In your edition of May 28 we see an article written by R. L. Hatschek entitled "Clay: Tap Huge New Aluminum Source?" describing a process announced by Lobeth Corp.

We are very much interested in this new process to produce alumina from low-grade clays. Would you be good enough to tell us if we can contact Lobeth.

L. WEILL
President
Industrial Mining & Trading Co.
Waynesville, N. C.

The Lobeth Corp. is located at 624 S. Michigan Ave., Chicago 5, Ill.—Ed.

Your President

Sir:

Would it be possible to obtain ten copies of your fine editorial on "You And Your President"? I would be glad to have a lesser number if the supply is short, but ten could be very usefully placed among some impatient people who believe a 20-year mess should be cleaned up in 6 months. We do indeed have a man in the White House who is "no politician."

E. M. ROGERS
New York

Tiny Engine

Sir:

On the Newsfront page of your May 14 issue you had an item on a tiny rotary heat engine.

I would like to obtain further data on this item and would appreciate your advising me the name and address of the Navy officer whom you mentioned as the inventor.

R. W. CRAMER
President
R. W. Cramer Co., Inc.
Centerbrook, Conn.

The inventor is Commander Ivan Monk, USN, Design Superintendent, New York Naval Shipyard, Naval Base, Brooklyn 1, N. Y.—Ed.

Deferments

Sir:

In the May 14 issue you advised of a new Navy booklet on the deferment of essential employees.

We are interested in receiving a copy of this publication and would appreciate your advising us where we could obtain further information.

K. PERPERIS
Atlas Steel Construction Co.
New York

The Navy booklet on employee deferment may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.—Ed.

Flex-Tester

Sir:

In the Mar. 19 issue, p. 143, there appeared an article on a new method of testing steel sheets using the Flex-Tester.

We are very interested in learning more about this instrument and would appreciate the address of Steel City Testing Machines, Inc.

A. G. ALLEN
Purchasing Agent
Lysaght's Works Pty. Ltd.
Bristol, England

The address of Steel City Testing Machines, Inc., is 8817 Lyndon Ave., Detroit 38, Mich.—Ed.

Materials Handling

Sir:

We have read a very interesting article in the May 14 issue entitled "Good Handling Speeds Heat Treating Of Small Parts."

We are wondering whether it would be possible for you to supply two or three reprints of this article for distribution within our organization.

S. GOLDSTEIN
Norca Machinery Corp.
New York

Electrostatic Painting

Sir:

In the "Echo de la Bourse" of Mar. 25 I have read an article by THE IRON AGE concerning painting without a gun.

I would appreciate the address of the American firm which has developed this process.

L. VERWILGHEN
Brussels, Belgium

The new Ransburg No. 2 Electrostatic Process was developed by the Ransburg Electro-Coating Corp., 1234 Barth Ave., Indianapolis, Ind.—Ed.

Will Keep Your Assembly Lines at Peak Capacity

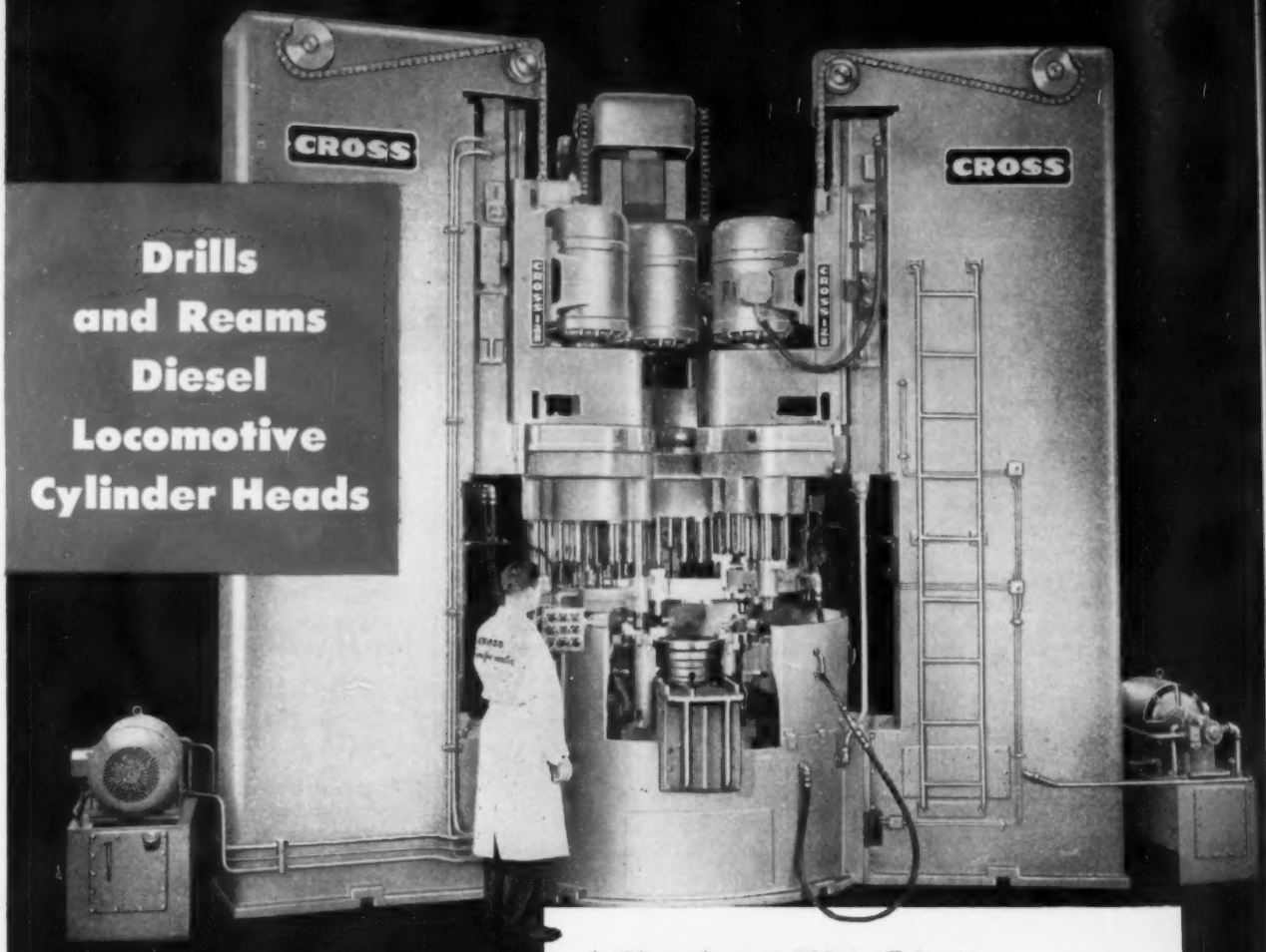
Whatever you manufacture or assemble, you can speed production and improve your product by using Pheoll screws, bolts and nuts. These industrial fasteners drive easy and straight, and will not bind because threads are accurately rolled or machined. Precision-made screw and bolt heads, slots and head recesses prevent wrench and driver slippage. Count, too, the added bonus you receive by using fasteners that improve product appearance.

An interesting story on standard and special industrial fasteners and their profitable applications to your needs may be obtained from experienced Pheoll engineers. Ask these men to recommend screws, bolts and nuts that will increase your overall profits on assembly line work.

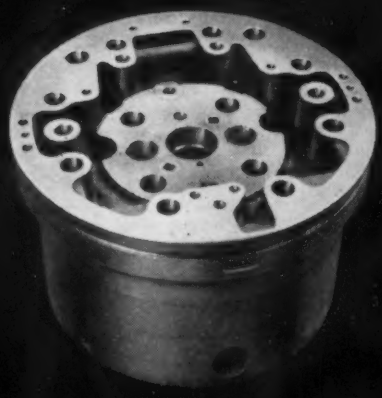
these Pheoll products prevent production lag
Tapping Screws • Cap Screws • Sems
• Phillips Recessed Head Screws and Bolts
• Machine Screws • Special Fasteners •
Thread Cutting Screws

PHEOLL SCREWS BOLTS NUTS

Another Special by Cross



Drills and Reams Diesel Locomotive Cylinder Heads



- ★ 50 per hour at 100% efficiency.
- ★ Seven stations: one, load and unload; two, drill 13 holes; three, drill 11 holes and spotface one hole; four, drill 12 holes; five, drill two holes, core drill three holes and chamfer three holes; six, ream nine holes, chamfer six holes and form two spherical seats; seven, ream nine holes, chamfer one hole and form two spherical seats.
- ★ Fluid motor driven index table.
- ★ Construction to Joint Industry Conference standards.
- ★ Other features—Hydraulic feed and rapid traverse, hardened and ground ways, automatic lubrication.

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by William M. Coffey

See?

Lately we have been receiving more than the usual requests from people who want to sign up with THE IRON AGE for 3 years instead of 1 year. So may we take this opportunity to lead you behind the scenes of your ffj and explain why we limit subscription periods to 1 year only? Thank you. (We can't be expected to run pictures of pretty girls every week).

There is presently being waged a sort of battle between magazines that have 3 year subscriptions and those that have only 1 year subscriptions. We don't think 3 year subscriptions can offer much to an advertiser because so many things can happen to people in 3 years—they can get fired, or drafted, or go to jail or die. When these things happen, of course, the advertiser won't reach the type of fellow he bargained for with his advertising message and the subscriber is sort of cheated too, because if he's dead, fired, or in jail he may not be able to fully use the magazine. See? So we rely on yearly renewals to avoid the "deadwood" in long subscriptions. To better illustrate the point, here's a letter we ran across recently. It was not addressed to THE IRON AGE, however!

Dear Sir:

Your letter to James Braden of the Braden Printing Ink Company has been finally brought to my desk for reply.

In your letter you rather imply that Mr. Braden was discourteous in not answering your previous letters.

Personally, I am sure that Mr. Braden did not mean to be discourteous inasmuch as he has been deceased for sixteen years.

Also I am sure that the Braden Printing Ink Company as such, did not mean to be discourteous inasmuch as they have been out of business for twenty years.

Your letter was somewhat delayed inasmuch as the Braden Printing Ink Company has not been located at 104 St. Clair Avenue for a matter of twenty-seven years.

Your previous letter was brought to the writer's attention, but inasmuch as I was not interested and the letter was not addressed to me, I did not think it was necessary to reply.

Very sorry that I cannot be more encouraging concerning your request for our participation.

Sincerely Yours,

Course, the above concerns a 20 year span. But the point is made. Please renew your subscription.

Automation . . .

. . . is the mechanical handling of parts and products in industry. For instance, Mr. Leonard J. Bishop of Mechanical Handling Systems, Detroit, is one of the few men in history who has applied automation to the chicken industry. Says Mr. Bishop: "One of my most fascinating assignments was mechanizing a poultry packing plant. An overhead conveyor system was the key to this job. We rigged a conveyor system that carries the bird past a killing station where a single man can kill *12,000* fowls in 1 hour. The birds are then carried through a scalding tank that loosens the feathers. Then they pass between two sets of rotary blades which do a fast mechanical job of plucking. At the end of the conveyor line the chickens are removed and packed for trucking. This automatic system costs only $15,000."

Lessee now . . . 12,000 chickens an hour . . . average 3 lbs. each . . . sell at 40¢ a lb. . . . set the automation for 8 hours a day . . . lessee, now.

Puzzlers

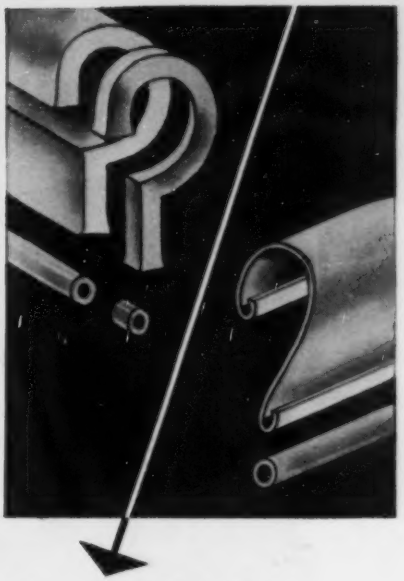
Here's the solution to the Poker Game-Cigarette puzzlers:

Brown—3 Old Golds
Perkins—15 Chesterfields
Turner—6 Kools
Jones—20 Luckies
Riley—8 Camels

And look at all the winners! Bill Farley 3rd, Raymond Robinson, Mary Lou Perrott, George Langzettel, Bob Herman and Ben Flickenschild, J. S. Prifogle, J. D. Golland, Joan Lais Murphy, B. M. Summeril, Leo Rider, L. D. Rice, L. S. Cochrane, W. F. Model, Wilma Cicero, A. H. Wendel, Lawrence E. Cooper, V. J. Trapani, C. Malinowski, Joseph Gardner, Albert Canfield, Norman Holcomb, George T. Barry, C. M. Dablen, Edwin C. Broker, J. Di Perry, Henry K. Chapman, F. Dunnaville, Helen Jackson, Arthur Logan, Thomas McNulty, Charles Noonan and Jack Lawler.

New Puzzler

A second-hand clothing man buys 147 garments, including coats at $2.45, trousers at $.98, and vests at $.49, spending a total of $147. How many of each did he buy to obtain the greatest number of 3-piece suits?



Extruded or Roll Formed?

WERNER CAN PRODUCE IT and Heat Treat—too in T4—T6 Tempers

IN	VOLUME
TO	PRECISION
WITH	SERVICE

Here's one source for your extruded or roll formed requirements that will back you up with all the service you need. Over 100,000 feet of floor area . . . 30 years of experience and millions of feet of custom extruded and roll formed sections make Werner a reliable, resourceful and skilled supplier.

Secondary operations also available . . . Anodizing, Cutting, Punching, Bending, Welding, Polishing, Assembly.

Here are a few of the many products on which Werner shapes are used . . .

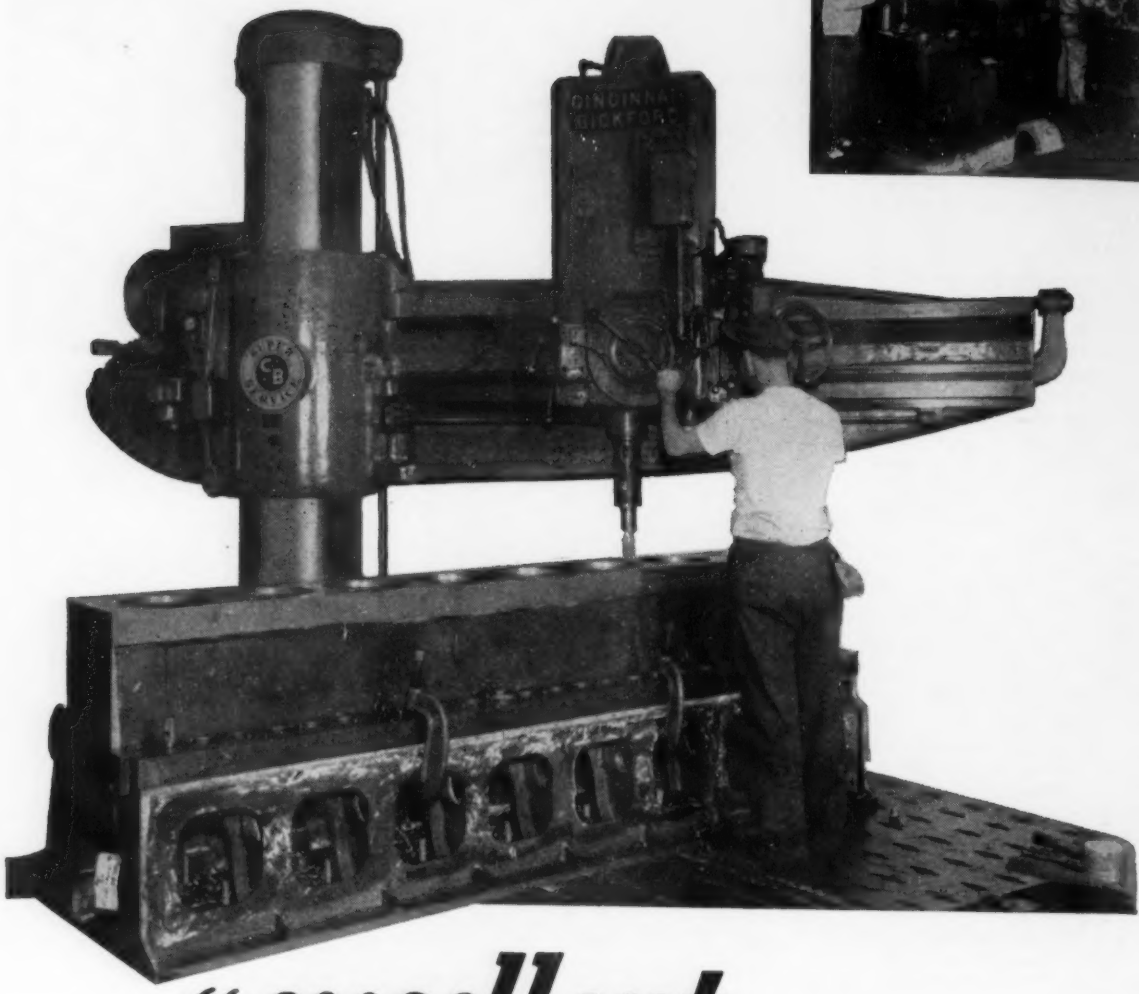
ELECTRICAL FIXTURES	TRAILERS, TRUCKS AND BUSES	TV ANTENNA TUBING & MASTS
STORM DOORS AND WINDOWS	RAILWAY COACHES	FURNITURE
SLIDING DOOR HARDWARE	AIRCRAFT	APPLIANCES

Whatever your product or your problem, call Werner—sales representatives are located in all principal cities — or WRITE for facilities folder today. R. D. Werner Company, Inc., Dept. FFI-1, 295 Fifth Avenue, New York 16, New York. Factories: Greenville, Pa.; Oshawa, Ontario, Can.

Werner ALUMINUM

Custom Extrusion and Roll Forming Aluminum or Stainless Steel

This battery of Cincinnati Bickford Super Service Radial Drills is drilling, tapping and reaming smaller parts.



"excellent in all respects..."

The ease of handling, the performance, accuracy and speed of the 7' arm, 19" diameter column Cincinnati Bickford Super Service Radial Drills "rated excellent in all respects."

The job involved drilling, tapping, reaming of 43 holes in a large diesel cylinder block.

A battery of smaller Cincinnati Bickford Super Service Radial Drills is also giving "excellent" performance.

Write for descriptive circular of these fine machines.

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

Dates to Remember

Meetings

JUNE

AMERICAN ELECTROPLATERS' SOCIETY—Annual convention, June 15-18, Benjamin Franklin Hotel, Philadelphia. Society headquarters are at 445 Broad St., Newark, N. J.

BASIC MATERIALS CONFERENCE—Annual exposition, June 15-19, Grand Central Palace, New York. Management—Clapp & Poliak, Inc., 341 Madison Ave., New York.

AMERICAN WELDING SOCIETY—National spring meeting, and welding and allied industry exposition, June 16-19., Shamrock Hotel, Houston. Society headquarters are at 33 W. 39th St., New York.

EXPOSITIONS

NATIONAL METAL SHOW—Oct. 19-23, Cleveland.

AMERICAN MANAGEMENT ASSN.—General Management Conference, June 17-19, Statler Hotel, New York. Association headquarters are at 330 W. 42nd St., New York.

RAILWAY SUPPLY MANUFACTURERS ASSN.—Exhibit, June 22-27, Atlantic City, N. J. Association headquarters are at 60 E. 42nd St., New York.

ALLOY CASTING INSTITUTE—Annual meeting, June 28-30, The Homestead, Hot Springs, Va. Institute headquarters are at 32 Third Ave., Mineola, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS — Semiannual meeting, June 28-July 2, Statler Hotel, Los Angeles. Society headquarters are at 29 W. 39th St., New York.

AMERICAN SOCIETY FOR TESTING MATERIALS — Annual meeting, June 29-July 3, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Society headquarters are at 1916 Race St., Philadelphia.

JULY

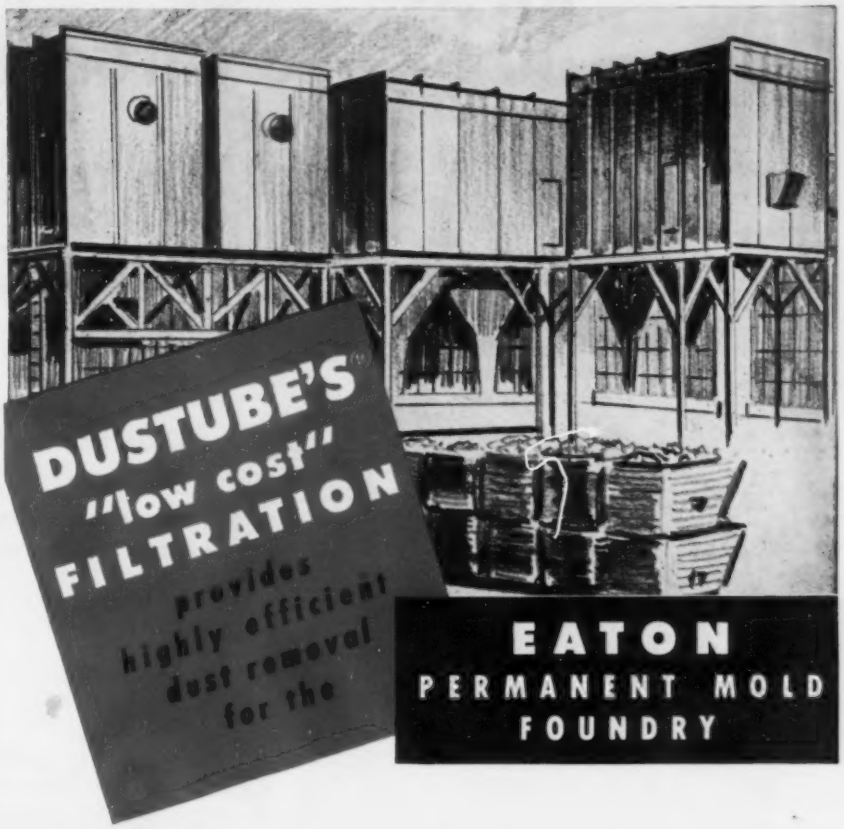
TRUCK TRAILER MANUFACTURERS ASSN.—Annual summer meeting, July 23-24, Edgewater Beach Hotel, Chicago. Association headquarters are at 1024 National Press Bldg., Washington.

NATIONAL TOOL & DIE MANUFACTURERS ASSN. — Summer meeting, July 30-Aug. 1, Milwaukee. Association headquarters are at 907 Public Square Bldg., Cleveland.

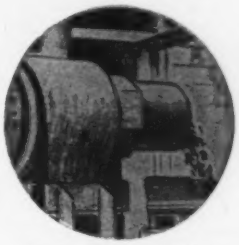
AUGUST

WESTERN ELECTRONIC SHOW & CONVENTION—Aug. 19-21, Civic Auditorium, San Francisco. Headquarters are at 1355 Market St., San Francisco.

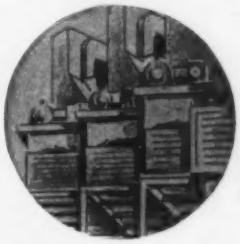
NATIONAL AUTOMATIC MERCHANDISING ASSN.—Convention & Exhibit, Aug. 23-26, Conrad Hilton Hotel, Chicago. Association headquarters are at 7 S. Dearborn St., Chicago.



Grinding



Rotating Mill



Blast Cleaning

ALL foundry cleaning operations of the world's largest producer of permanent mold gray iron castings, the Eaton Manufacturing Company, Vassar, Michigan, are ventilated by eight Dustube Collectors. According to Mr. Edward C. Hoenicke, General Manager of the Foundry Division, they are "pleased with the low cost operation and high efficiency of the Dustubes and are very proud of the cleanliness of our cleaning department."

Equipment ventilated includes seven Wheelabrator Tumblasts, a complete grinding room with both snag grinders and end grinders, tumbling mills, and a large continuous rotating mill.

Dustube's high efficiency and low cost operation are a result of its simple, effective design. There are no abrading metal parts to damage the cloth tubes. The perfected method of shaking the tubes removes as much of the accumulated dust as is commensurate with collection efficiency and resistance requirements. Inspection and necessary lubrication are readily and safely made on the clean air side of the collector.

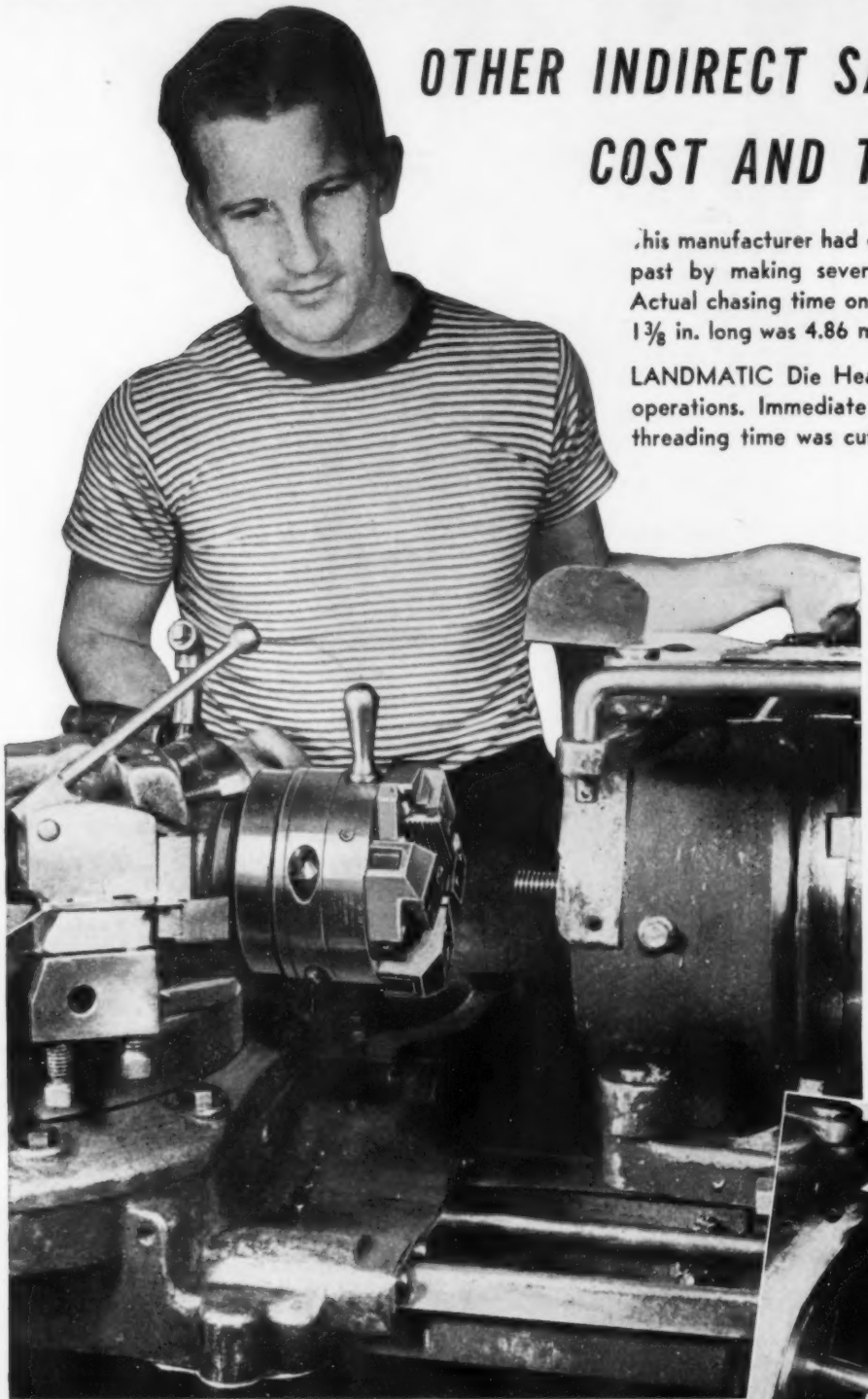
Let Dustube engineers show you how you can eliminate the dust problem in your foundry at low cost. Write today for full details.

American
WHEELABRATOR & EQUIPMENT CORP.
509 S. Byrkit St., Mishawaka 5, Ind.

dustube®
COLLECTORS

Now... 36 Pieces Threaded Instead of 1

OTHER INDIRECT SAVINGS IN TOOL COST AND TOOL INVENTORY



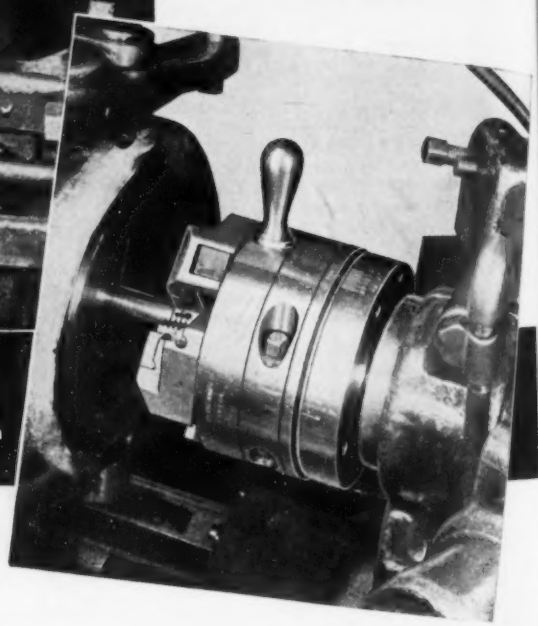
This manufacturer had cut threads on adjusting screws in the past by making several passes with a single point tool. Actual chasing time on the .623 in. diameter 8 pitch thread 1 3/8 in. long was 4.86 minutes.

LANDMATIC Die Heads were installed to perform these operations. Immediate savings were realized when actual threading time was cut to 8 seconds.

LANDMATIC Die Heads are well-suited to cutting these modified square threads. Rigid construction holds the chasers firmly—line contact with the work reduces friction and cutting strains—thus making it possible to produce the thread in a single pass.

Other savings accrued from LANDMATIC Heads. Interchangeable chasers can be reground singly, and for over 80% of their length. A single chaser can be replaced in the set. Chasers will maintain a more consistent thread form than a single point tool.

For more information about these cost-cutting tools, write for Bulletins F-80 and F-90.



LANDIS *Machine* CO.

WAYNESBORO • PENNSYLVANIA • U. S. A.

50TH ANNIVERSARY

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

A 36-FT PLASTIC TYPE SHIELD has been made to cover snorkels and conning towers of submarines. Shield permits higher underwater speed with the same power. Use of plastic also makes radar detection more difficult.

AN ORGANIC COATING WHICH MAY be a satisfactory replacement for tinplate in the manufacture of containers and closures for food and other products has been developed by a large research institute. The same group also compounded and evaluated adhesives as possible replacements for solder in making food cans.

ALUMINUM AND STEEL are being used in experimental "hydrofoils" for Navy small craft. Winglike sections would be fitted to hull bottoms to provide lift when sufficient speed is reached. Once the hydrofoils support the vessel's weight, there is less water friction, faster travel.

CARBON PLATE CONSUMERS apparently are convinced they face a tough procurement problem in the next 6 months. Some are pressuring producers for fourth quarter commitments. Others are planning long-term deals for foreign plate. Aggravating the problem is reluctance of producers to roll plate on sheet-strip mills.

WALTER REUTHER'S VICTORY on the "living document" theory of wage contracts in the auto industry is causing grave concern in some other industries, including steel. Comment heard is. "What's the use of bargaining an agreement if neither side has to live up to it."

WIDESPREAD USE OF ELECTRICAL WEIGHING will reduce costs and make pouring of molten metal a scientifically exact procedure. Use of electrical "load cells" in some openhearth departments has already eliminated monthly bookkeeping tonnage headaches.

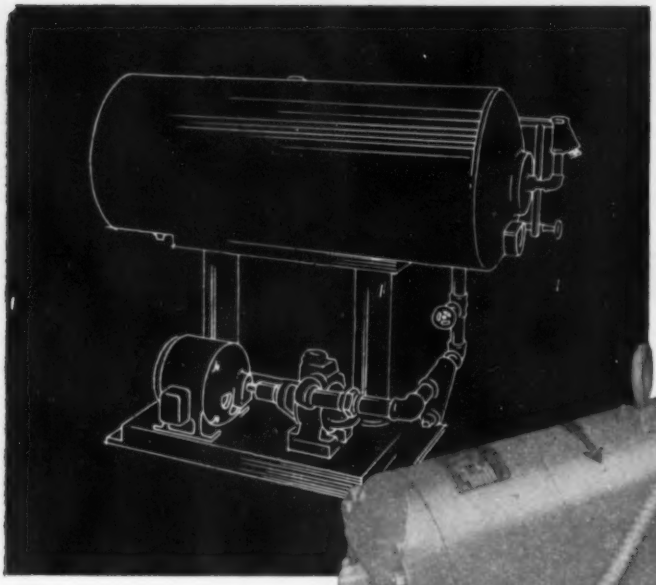
STEAM TURBINE MEN are talking in terms of 500,000 kv units, about twice as large as those currently being built. Recent advances in generator cooling make the units more feasible at considerable cost reduction. Double shaft units of 3600/1800 rpm cross-compound design may be used.

STEEL INDUSTRY'S LONG TERM DEBT increased 40 pct in 1952. At year's end the industry's debt stood at $1.5 billion. Expansion is chief reason for debt increase.

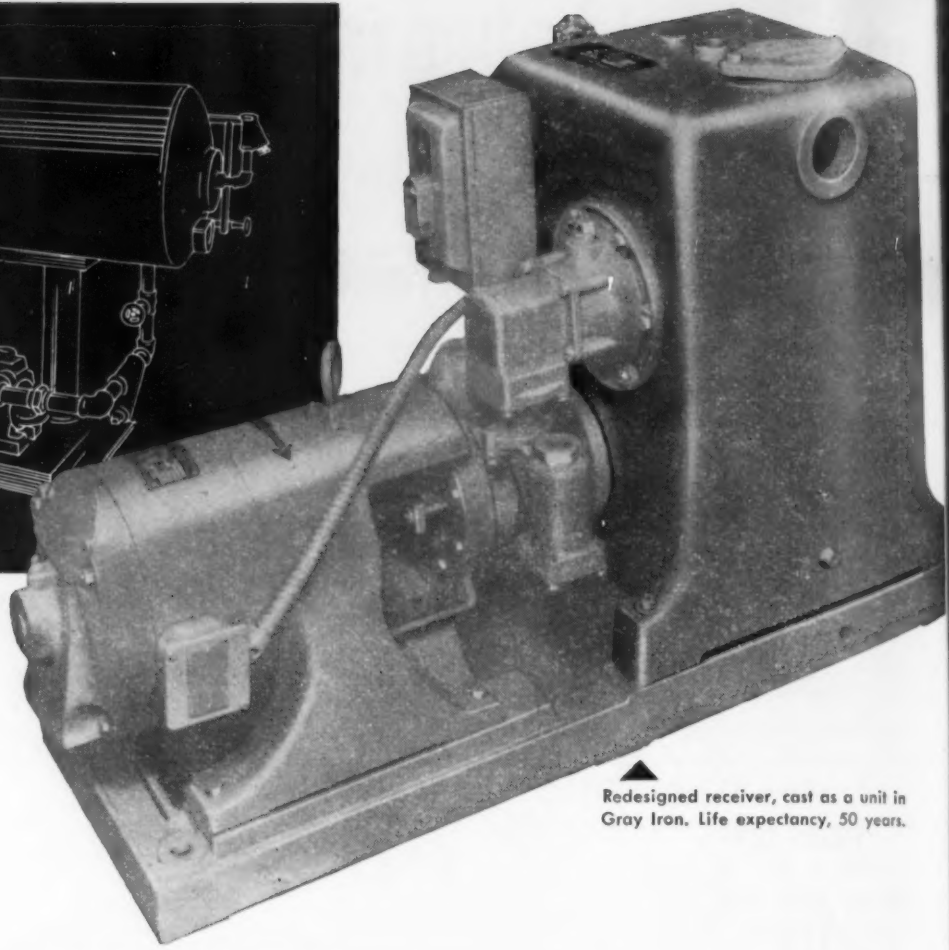
WHILE FARM EQUIPMENT MAKERS continue to press for mill steel and buy warehouse raw steel, their purchases of components are beginning to fall. Production cut-backs are common.

DEMAND FOR EUROPE'S STEEL CONTINUES. One large automaker has contracted for a reported 56,000 tons, mainly sheet, for delivery through second and third quarters. At least 1000 tons has been delivered.

A UNIT FOR BLOWING REFRACTORY MATERIALS INTO CUPOLAS where relining is necessary is now in the field testing stage. The device can also be used for applying plaster and other construction materials.



Conventional type of Boiler Feed Pump; steel receiver mounted on steel cradle. Life expectancy, 5 years (average).



Redesigned receiver, cast as a unit in Gray Iron. Life expectancy, 50 years.

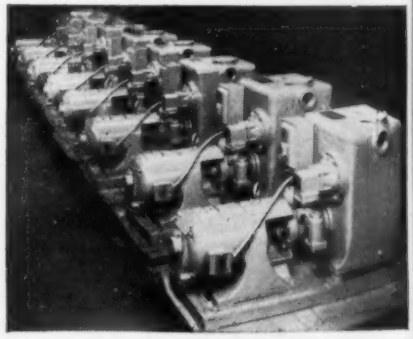
COST SAVINGS BUILT IN by practical use of GRAY IRON!

In Boiler Feed Pumps, first cost is less important than long-time economy. Because water conditions often cause certain materials to deteriorate rapidly, replacement costs are frequently high.

When a leading manufacturer replaced the conventional steel tank with a Gray Iron casting, here's what happened:

- In spite of somewhat higher initial cost, savings at the end of a 5-year period amounted to 38%—including replacement cost of steel tank, plus labor and fittings. This important saving in replacement cost will be realized every 5 years for approximately 50 years.
- By designing for the cast Gray Iron receiver and subbase mounting, space requirements were reduced—excess piping, valves and fittings were eliminated.

Have you analyzed *your* product for possible cost savings which can be accomplished by designing for and with Gray Iron? Write for technical information on the many advantages of the Gray Iron casting process.



Boiler Feed Pumps with Gray Iron receivers, built for U. S. Navy.

Make it Better with Gray Iron . . .
Second largest industry in the metal-working field

GRAY IRON FOUNDERS' SOCIETY, INC.

NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO

NOISE: Does Your Plant Deafen Workers?

Industry's getting wary of compensation suits bound to come up . . . Watch out if your plant generates noise over 90 decibels . . . Metalworking among noisiest—By *T. Metaxas.*

Impending compensation payments for impaired hearing, humanitarian motives and the need to raise worker efficiency are working to subdue industrial noise —or to tone down the ear grating loudness that sometimes degenerates a worker's hearing or distracts him in his job.

And metalworking plants are louder than most because when metal strikes metal to cut it, to shape it or finish its surface the result is unavoidably noise. As machines get more power, speed and driving force, metalworking's noise level swells.

Pandora's Box Open?

Management has maintained that the worker accepted noise as a risk he must take. Management has also been unwilling to give too much public recognition to the danger of noise for fear that a Pandora's Box of compensation troubles would be opened. But the lid has now been lifted, for insurance carriers and almost all states have accepted occupational deafness as a compensable injury.

Not all plants generate noise of high enough intensity to deafen workers or to reduce their efficiency. Although several research teams have tried, they have failed to evolve defensible evidence that moderate level factory noise hurts hearing or lowers productivity. There is on the other hand incontrovertible evidence that long exposure to noise over a still unsettled limit of intensity can impair hearing and reduce efficiency. When noise is loud enough, it can irreparably damage the hairlike cells in the inner ear.

Queried by Flent's Products Co. recently, state labor departments listed the following industries as presenting the most serious noise problems: Textiles, shipbuilding, structural steel, transportation equipment, lumbering, pulp and paper, rolling mills, foundries, forge shops, airplane and automotive, smelting and refining, machine shops and other metalworkers, electrical equipment.

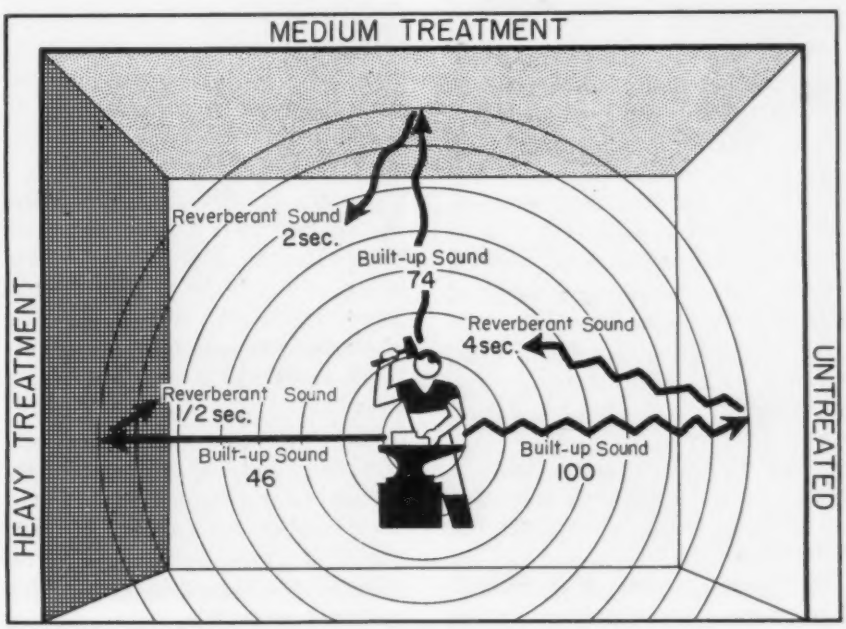
To attack harmful sound, we must know the character of the enemy. When a material makes noise it transmits vibrations through the air to the ear. A decibel is a measurement of sound's intensity, generally determining its loudness. Baritone and bass sounds are of low frequency. In the piercing soprano register are the high frequency sounds such as shrills and shrieks.

If you enter a factory you can detect the underlying energy of sound in the form of vibration through the floors, columns, pipes, supports. These are absorbing the quiver of presses, shears, machine tools as they work, contributing to the wear of machines and building, unbalancing precision.

Coursing through the machine, vibration seeks large flat surfaces for an outlet. When it reaches such a radiator you can hear the rattle.

From the rotating machines come air borne noises, vowel shaped or pure tones. Then there are the air borne noises of abrasion and impact, manifested in a broad range of frequencies and intensities from the thud of a machine exerting slow pressure to the whine of a saw.

If the plant had no walls or ceil-



HAMMER ON ANVIL creates outward ripples of sound waves. When reflected from untreated or hard plaster walls which absorb little of sound energy, reverberation continues for 4 sec after sound has ceased. Ratings for acoustical treatments are given.

ing the sounds would radiate from their sources, be heard once, and travel like ripples outward into the air. But because plants must have walls and ceilings, sounds do return many times, are even spread out over great distances. This is caused by sound reflecting from solid surfaces. Original sounds are built up, jumbled up so you can't tell where they come from, and directed at the ear from many directions.

When sound reflects off a wall it loses some of its energy which is absorbed. Hitting a hard surface such as plaster or steel or glass, a sound wave loses perhaps 5 pct of its intensity while the rest continues bouncing. If a sound wave hits a wall of acoustical material, capable of absorbing perhaps 70 pct of its energy, only 30 pct is reflected.

Hammers are Noisiest

To get a perspective of the decibel intensity of sound, consider that the decibel rating of ordinary conversation is ranked as somewhat over 50. The decibel rating of average factory noise has been rated at about 85. Screw machines, punch presses, riveters, cut off saws were given ratings of 100 db and over. Noisier still were chipping and drop hammers, rated at 120.

Many ear specialists tentatively have agreed that sounds over 90 db will after prolonged exposure impair hearing. Immediate damage can be done by blasts of 150 db—while 130 db can produce pain, headaches, nausea.

Unexpected and shrill sounds rising above the general level of sound have a startle effect on man, accelerating his heart beat, raising his blood pressure.

After an adjustment period when performance may be low, normal people will settle down in a moderately noisy area and work as well as their counterparts in relative quiet.

Evidence of research is conflicting. Some experimenters claim men work better in steady, moderate noise because it quickens their tempo of physical action and insulates them against distraction. Others claim not.

But in the more violent reaches of noise—over 100 db—men can become profoundly uncomfortable or temporarily deafened.

If a manufacturer has a general noise level of under 90 db in his plant, he may silence only the more objectionable loud or "startle" sounds.

But if a plant owner finds he has a noise level of over 90 db, he may decide on drastic noise reduction. First, he can try to subdue the sound at the source—if possible. Failing here he can shield the offending machine to keep the sound from spreading through the rest of the plant.

How Loud Industry Sounds

Source	Decibels	Rating
Pneumatic Riveter Pneumatic Chipper	Over 120	Threshold of Feeling (actual physical pain)
Multiple Sand Blast Unit Automatic Punch Press Nail-making Machine Boiler Factory	100 to 200	Deafening
Noisy Factory Automatic Lathe Unmuffled Truck Loud Street Noise	80 to 100	Very Loud
Calculating Machine "Quiet" Factory Noisy Office Automobile	60 to 80	Loud
Average Office Household Fan Average Conversation Quiet Radio	40 to 60	Moderate

To thwart reflection of sound waves he can either use porous acoustical panels laid over his ceilings and if he's really determined, over his walls. But the cheapest way out may be to suspend acoustical panels over noisy areas.

Starting first to halt vibrations, the manufacturer can set his machines on resilient mountings of steel springs or rubber. He can also interrupt the path of vibrations within his machines by using resilient materials.

Machine surfaces radiating sound can be covered with fibrous material blanketed with heavy paper or cardboard.

Redesigning machinery is impossible at the metalworking plant. If it is done on the drafting board the builder should prolong the impact force so that the full intensity of sound is not delivered in a short time. Prolonging this impact also reduces vibration and consequently wear. Staggered instead of simultaneous impact also cuts the intensity and frequency of noise.

When improper maintenance permits clearances of gears, clutches, bearings, automatic feeds to become excessive, the machine adds to its din.

The next step is erection of shields around noisy operations. These shields should not be so light or be coupled to the vibratory path of the machine that they themselves become noise makers. If lined with some acoustical material and given resilient mountings, the shields will effectively block and absorb sound waves.

Success with Baffles

Noisy pipes and ducts can be stilled by steel ribs or by covering them with dampening material. Exhaust roar of internal combustion engines can be effectively muffled with snubbers.

J. Leukart Machine Co., of Columbus, Ohio, reports successful results with suspended fiberglas acoustical baffles—a reduction of 35 pct in the noise level at 25 pct the cost of a full acoustical treatment. Leukart claims productivity rose 7.2 pct, that the scrap or reject rate fell 25 pct. Oral communication was impressively improved.

Yet even full acoustical treatment cannot silence sound coming directly from the source. If the sound is still intense, the wearing of ear plugs should be mandatory.

Ear stopples must completely seal the ear canal and be able to attenuate sound by around 30 decibels. On the market are stopples made of wax impregnated cotton, plastic and rubber.

A noisy plant without hearing

tests before and after hiring is vulnerable to compensation suits. Workers deafened in other plants and those susceptible to hearing damage can go on the payroll—to grow deafer. Without an audiogram of a worker's hearing, you can't establish a base to check whether he is susceptible to noise.

Thirty days after the initial audiometric test the worker should be given another to discover if his hearing level has changed. If no change is found, tests should be given twice yearly.

Loss of earnings is no longer the sole criterion in compensation cases. Most men filing suits for impaired hearing have suffered no such loss.

Deafness is Accrued

A landslide of compensation payments within a ruinously short time does not seem possible. Absence of scientific proof of degree and permanency of deafness has postponed many cases, discouraged others.

Since deafness is an accrued disease, the courts do not know how much of it to blame on the last employer—but it may be likely that the latest employer will take the brunt of it.

The courts must also consider how much of impaired hearing was caused by age, nutritional deficiencies, previous sickness, heredity. Ear specialists say that to establish both degree and permanency of deafness a worker must be removed from the noisy environment for from 8 to 18 months. Appreciable recovery may take place in this time. Not many workers are willing to go unemployed this long. Although cases have been suspended, workers are usually given the right to reopen them later.

Industrial deafness frequently means loss of hearing in the higher frequencies and not the lower which constitute all the important sounds a worker's likely to need to hear.

Since impaired hearing may not constitute a loss in earnings, paying the worker off when he retires may be found most feasible.

CANADA: What Europeans Want to Sell

If Canada's International Fair is any indication it's machine tools . . . Some exhibits all sold out . . . Americans attend in force . . . Seek to enter U. S. market—*By F. Sanderson.*

What do European nations want to sell? If the Canadian International Trade Fair held in Toronto June 1 through June 12 is any indication, it's machine tools. More than 75 pct of exhibit space taken by the 27 countries represented was taken up by machine tools.

Although the Fair is traditionally a showplace rather than a marketplace, some tool exhibits have been entirely sold out and many orders placed for future delivery. In the Fair's first 3 days hundreds of thousands of dollars worth of machine tools were sold.

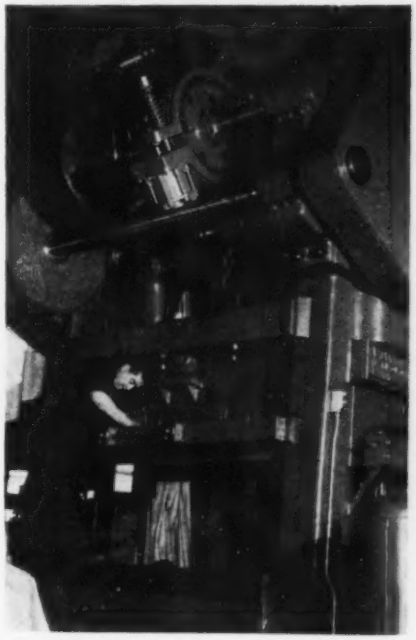
European toolmakers were not only aiming directly at the Canadian market but claimed they were using the Fair as sort of a back door into the U. S. market. Now that European industry has been rebuilt it is ready to compete in world markets for production equipment to the world, foreign representatives told THE IRON AGE.

Since Canada, too, is interested in enlarging its two-way trade with others, it has thrown open its doors to Europeans. About the only nations not represented were those behind the Iron Curtain.

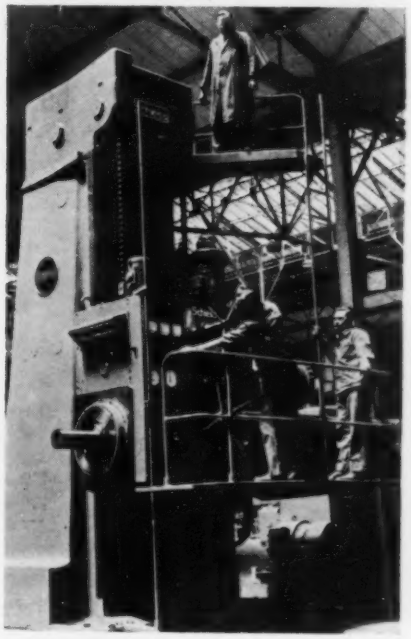
Over the years the U. S. has held first position in selling machine tools to Canada but now many Canadians are saying that English and European builders will steadily gain ground in Canada and other markets.

The Fair was loaded with Americans from practically every state in the Union who came to see what the competition was doing and what was being offered. In many instances, they were buyers.

In the 7 years the Fair has been held by Canada, some 50 new industries have been established which find their root in the exposition. Many of these are subsidiaries of established American and European firms. Names of American subsidiary firms in Canada read like a blue book of industry.



REFRIGERATOR DOORS and similar sheet steel fabrications can be stamped out on a 32-ton press made by Brown Boggs. The press is on display at the Canadian Fair.



LARGEST MACHINE shown at the Canadian Trade Fair was a 60-ton Schiess boring and milling machine. It was purchased by an American manufacturer.

CLAD METALS: "Small" Item Gets Big

One of steel industry's fastest growing segments, clad steel is finding new applications . . . Advantages include price, scarce metals savings—By J. B. Delaney.

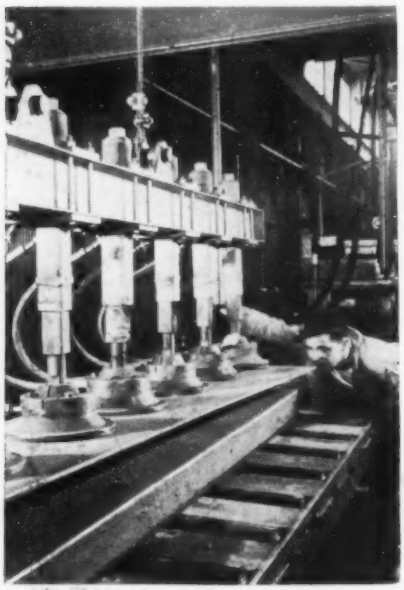
One of the fastest growing "little businesses" within the steel industry is clad metals.

Tonnagewise, production is small in relation to other steel products. But its applications, both for defense and civilian purposes, are growing. Several producers are expanding facilities. Prospects of further expansion and entry of new companies into the field are considered good.

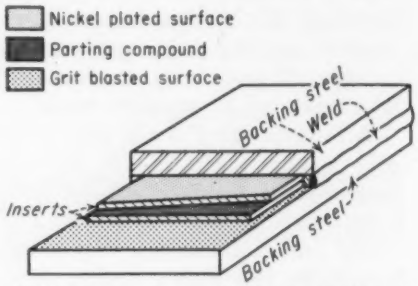
Factors favoring expanded use of clad metals include improved production processes that have increased applications, price advantages, and conservation of scarce or critical metals.

Clad Use Jumps

Plates, sheets, and strip probably account for most clad metal production, but copper clad bars and wire are also important factors. "Clad metals" cover the bonding of stainless steel, nickel, monel, inconel, copper, copper-zinc alloy, and aluminum with carbon steel, and the bonding of stainless steel with copper. Some producers also have their sights on cladding carbon steel with tantalum, titanium, and zirconium.



INDUSTRIAL SANDWICH of steel and copper is assembled at Superior Steel Corp., Carnegie, Pa. Suction cups place copper slab on assembly table after which magnet positions 2200-lb steel billet as sandwich "filling." Second copper slab is then put on top as shown in picture above.



FOUR-PLY pack assembly for production of clad stainless steel. Sandwich is a double-decker, with two layers tack-welded together to yield two clad steel plates after bonding. Parting compound insures easy separation.

Since 1939, production of stainless clad plate has increased over 2200 pct, according to T. T. Watson, director of research, Lukens Steel Co., which has been producing clad plates since 1930. Lukens is now in the midst of a "major" expansion of clad finishing facilities.

Who Makes It

Superior Steel Corp., leading producer of clad strip steel, this week dedicated a new clad metal plant that will increase its capacity from 30,000 tons to approximately 80,000 tons per year. This plant for the present will be devoted exclusively to production of gilding metal (90 pct copper, 10 pct zinc) clad steel strip for bullet jackets.

Other major producers of clad metals include Jessop Steel Co., Claymont Steel Div. of Colorado Fuel & Iron Corp., Alan Wood Steel Co., Ingersoll Steel Div. of Borg-Warner Corp., and American Cladmetals Div. of Salem-Brosius, Inc. Republic Steel Corp. produces limited quantities of stainless clad sheets at its Canton, Ohio, plant.

Some of the more important applications of clad metals include gaskets, radar electronic equipment, spark plug gaskets, automotive radiator parts, parts for X-rays, radio and telephone equipment, gas meters, cooking utensils, costume jewelry, pressure vessels, and food processing.

Bulk of Jessop Steel's production is going into maintenance work and new construction in the oil and chemical industries and gates in flood control dams.

Jessop is looking forward to its best year since 1946 when dollar sales amounted to $2.5 million. Sales slumped somewhat in the intervening years, but on the basis of 5 months this year, 1953 sales will be over $2 million.

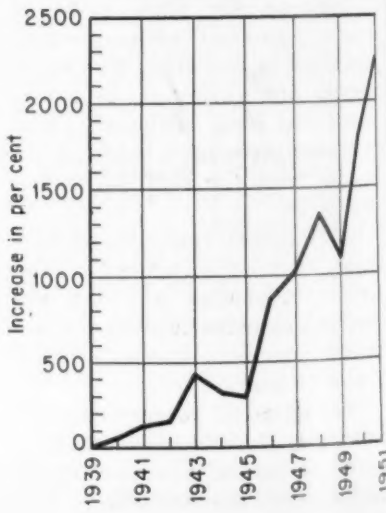
Defense Comes First

The new plant of Superior Steel is a $7.75 million joint venture of the company and Army Ordnance. With new methods and processes and the latest equipment, including some "firsts" in the field, the plant is expected to save the government between $100 and $150 a ton. Superior's basic clad metal process, which it developed in 1939, has saved 80 pct of copper and zinc used in each bullet jacket cup.

Under Superior's arrangement with Army Ordnance, the government will have first call on production but facilities may be used commercially when not required for defense. Superior will pay the government a rental on all facilities used for commercial production. Plant capacity is 330 million bullet cups per month.

During World War II, Superior's

Growth of Clad Stainless Output



gilding metal clad strip became a standard specified material for use in some parts of small arms ammunition. Eighteen other steel companies were licensed, royalty free, to use it during the emergency. Superior produced about 120,000 tons of this metal, making available for other purposes an estimated 80,000 tons of copper, and 10,000 of zinc.

When clad metals are properly bonded, they can be drawn, rolled, spun, bent, twisted, heated and quenched, upset, punched or otherwise formed as though they were a solid metal. The layers cannot be physically separated.

Over 20 different methods of cladding are described in U. S. patents, but only five are in general use today: Pressing, casting, direct rolling, sintering and deposition. Probably the greatest tonnage is produced by the sandwich assembly and hot-rolling method, although a large part of the tonnage is accounted for by the casting method.

—Construction—

Building:

Dollar volume shows increase for fifth consecutive month.

Widespread poor weather during May failed to hold back construction work which, supported by increased availability of materials, for the fifth successive month showed a gain in dollar volume over last year.

Preliminary reports assembled by the Bureau of Labor Statistics showed that more than $2.9 billion worth of new construction went up during the month.

This brought the 5-month total to $12.6 billion, a new record in itself, almost 6 pct above the same period last year.

For the first time in 11 months, industrial construction failed to show a drop over the previous year's figures. But for the 5-month period industrial building, estimated at $1 billion, is still running slightly behind last year.

Bad weather has held highway construction to about the same levels as last year.

—Manufacturing—

Moving Head, Not Work, Speeds Welding

Turnabout sometimes pays off. Application of this principle to an unusual welding machine has substantially cut costs and speeded production on J47 jet engine exhaust cone assemblies for Solar Aircraft Co. at San Diego.

Conventional resistance welding electrodes remain stationary while the part being welded moves. In Solar's planetary geared roll-welder, the upper electrode automatically seamwelds around a circular path while the work stands fast.

Designed and built for $14,000, the machine replaces seven spot-welders totaling $49,000 previously needed to join afterburner fuel manifolds to engine exhaust cones. One man operates the unit, against seven previously.

Time of the welding cycle has been cut almost 80 pct, from 4 hours to 45 minutes. And parts handling has been significantly reduced.

Fully Automated Welding Cycle

After positioning the work and closing the lower electrode, essentially an air-operated clamping fixture, the welding operation is completely automatic. Welding speed is adjustable from 8 to 48 in. per min for a 3-in. diam seamweld around the fuel manifold support bosses.

Another unusual feature of the machine is that the upper electrode carries about 14,000 amp through a ½-in. diam shaft and a floating joint. Path size of the electrode may be varied from zero to a 6-in. radius.

Designed by Solar, the rollwelder was built by Taylor Winfield Corp. Basic unit is a medium series, 36-in. throat, 150-kva transformer, low inertia head seamwelding machine. Special tooling can be replaced in under 30 min by conventional tooling, making the machine a standard universal (circumferential or longitudinal) seamwelder.

METALS

Because they are necessary to our way of life, people take appliances for granted. They expect them to work without constant adjustment or repair, and to last many years. That's why you'll find beryllium copper used in vital subassemblies of most appliances today. For parts and key numbers, see below.

SERVICE-FREE PERFORMANCE

Beryllium copper offers appliance makers design advantages plus greater reliability

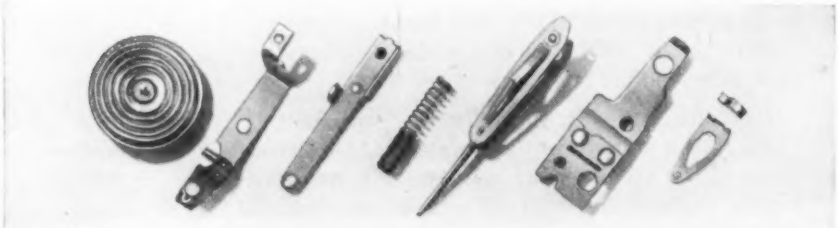
For those manufacturers who take advantage of it, beryllium copper reduces failure—increases customer satisfaction. Temperature controls, timers, brush springs and motor overload relays made of Berylco beryllium copper can be depended on to work unerringly—don't require frequent service.

Beryllium moved out of the laboratory into industry when it was discovered that as little as 2 percent added to copper produced an alloy with remarkable properties. No other material meets to the same degree such diverse qualifications as conductivity, mechanical strength, endurance and elasticity. That's why Berylco has successfully solved design problems involving conflicting requirements for practically all industries.

Manufacturers find that these performance advantages can easily be converted into cost-saving ones as well. Where electrical circuits are involved, Berylco's ability to withstand high stresses makes simpler designs possible. Its elastic strength offers space-saving opportunities. Its formability permits easier fabrication.

Once regarded as rare, beryllium copper is now in plentiful supply. Manufacturers interested in using this versatile alloy are welcome to share the facilities and know-how of the world's largest producer. Write THE BERYLLIUM CORPORATION, Dept. 3-F, Reading 6, Pa.

Tomorrow's products are planned today—with Berylco beryllium copper



BERYLCO PARTS, AND WHERE THEY FUNCTION in the modern kitchen, can be seen by locating the corresponding number in the large photo on this page. The parts shown are: (1) temperature control; (2) oven control; (3) timer part; (4) brush spring; (5) overload relay; (6) toaster spring; (7) contact springs for refrigerators.

—Labor—

STEEL:

Wage talks unemotional, relaxed . . . Blowup is unlikely.

This year's steel labor negotiations may turn out to be the most unemotional since the industry and United Steelworkers first sat down together to hammer out an agreement.

A big blowup may yet materialize but both U. S. Steel Corp. and the union seem determined to confine name-calling, if any, to the conference room. Tempers may grow shorter as the deadline of June 30 moves closer, barring a quick agreement.

Latest labor news on p. 151

No attempt is being made to cover up the seriousness of the negotiations. But representatives of both sides enter the meeting rooms with more relaxed demeanor than in previous years. A certain amount of banter passes back and forth at the start of negotiating sessions.

The talks have settled down to a debate on economics, with one group trying to sell the other on the idea that a wage increase is or is not justified.

Try Change of Pace

This lack of public recrimination could reflect several things.

First, the union has a new leader, David J. McDonald. Although schooled under the late Philip Murray, who loved a fight, Mr. McDonald may be trying a change of pace in the hope of gaining his objective without ruffling a lot of tempers.

Second, the influence of economic and political factors. Although operating at capacity, the steel industry is not so prosperous as Mr. McDonald says it is. Some of its leaders believe this may be the last "boom" year for a while. The Administration in Washington apparently is determined to favor neither side. So the union is pretty much on its own this trip.

The union is on record as demanding a general wage increase.

HEATING: Worth Using Electricity?

Partisans of electric heating field claim advantages of quick response, efficiency outweigh extra cost of power equipment . . . Field seen as growing—By *R. D. Raddant.*

"Built-in values, instant response, adaptability, efficiency, versatility" are the terms used by electric heating specialists to point up the reasons for the good progress made by the industry in recent years. These values of electric heating are also foundations for future progress.

Although the industry has extended itself into all branches of metalworking—from electric furnace steelmaking through induction hardening of small parts—it may still be in its infancy in taking over jobs that were held down exclusively by combustion heating.

This conclusion was drawn at a recent conference on electric heating of the American Institute of Electrical Engineers in Detroit.

'Advantages Win Out'

Advantages of electric heating are universally recognized but the issue usually boils down to whether its advantages can compensate for extra cost of electricity and equipment. Partisans of the field say in most cases they can.

Clean, quiet, portable electric heating is also fast, can be controlled with accuracy, and can be tailored to a specific job. Because it can be frequently converted to 100 pct useful heat, it is considered highly efficient.

Biggest growth has been in electric arc furnaces and induction heating—two fields which have not yet approached their limits. Producing special alloy steels more economically and efficiently, electric arc furnaces entered steelmaking in 1910.

Bessemer Electric Team

By 1951 they were making almost 7 pct of all steel produced in the U.S. Increasing use of alloy steels logically indicate expansion of electric furnace capacity.

Interest mounts in the possibilities of using electric furnaces for plain carbon steels. One recently announced expansion of facilities in Detroit includes a blast furnace but no openhearth furnaces. A Bessemer converter will instead team up with new electric furnaces.

In the auto industry electric heat is used in a wide variety of ways—to heat treat tools, dies, gears and other parts. The industry uses large arc melting furnaces, heat treating furnaces, induction heaters for heat treating, and radiant or infrared equipment.

Dr. H. B. Osborn, Jr., technical director of the TOCCO Div., Ohio Crankshaft Co., lists more than 20 applications of induction heating in the auto industry today. These include crankshafts, camshafts, trunnion cups, rocker arm shafts and rocker arms, gears, pins, and many others.

Many times the switch to electric induction heating resulted in substantial savings.

Save 4¢ a Piece

An example is the adoption of induction heating on shifting levers resulting in a saving of 4¢ per piece or $25 per hr. This is only one of 139 parts induction hardened by Lima-Ohio Corp. All 139 show savings over conventional heating methods.

In another instance International Harvester increased production on one gear from 14 to 35 per hr. The substitution of a plain carbon steel instead of alloy steel, plus elimination of shot blasting and extra machining operations resulted in a savings of $82,500 a year.

While metalworking appears to hold the greatest future, the expanding plastics field may be equally important to electricity. The particular advantage of electricity is its controllability because plastics require constant and exact temperatures. A few degrees can mean the difference between the plastic being too solid to work and burning.

When to Use Electric Heating

Some rules of the thumb listed by Glenn S. Young, of the Kansas City Power & Light Co., pointing out what electric heating should do to be justified:

- **When there is a reduction of materials handling.**
- **When there is an improvement in product or working conditions.**
- **When rejects are reduced or eliminated because of accurate control of temperature and rate of heating.**
- **When warm-up time is reduced significantly.**
- **When floor space is saved.**
- **When prior or subsequent operations are reduced or eliminated.**
- **When less expensive raw materials may be substituted.**

Labor

The "how much" may leak out this week. Final settlement is likely to be in the neighborhood of 10¢ an hour. The steel companies would have to offset this with a price increase of about $4 per ton.

Though a strike is always a possibility, neither side wants one. And the odds still favor a peaceful settlement.

Gas Turbine Lab to Open in Fall

Steelwork has been completed on Westinghouse Electric Corp.'s $6 million steam and gas turbine research and development laboratory at South Philadelphia, Pa. The building is scheduled for completion this fall.

One steel structure of the building will support incoming steam lines from the laboratory powerhouse.

TOOLS: Builders Seek End of Cycles

Feast-or-famine industry feels its wild cycles could be flattened . . . Need middle-of-road policy . . . Like Vance plan . . . Seek replacement, export markets—By R. M. Lorz.

Machine tool builders are straddling a fence that could topple in either direction. Many believe they can land on their feet if government and industry get together on a sane middle-of-the-road policy.

Almost any machine tool builder will agree he has seen lean years typical in the business cycle which traditionally runs its course in the industry. But aggressive firms aren't convinced that it is impossible to sell so-called postponable items when defense buying is low. They believe the roller coaster sales graph can be modified.

Must Sell Replacements

Conservative thinkers who aren't whistling in the dark say the job can be done but it won't be easy. Surface prospects look good as civilian demand picks up.

The joker in this picture is buried in the nature of the product. Even though there are an estimated 437,000 machine tools needing replacement, it will take hard selling to move them off the production line.

One builder succinctly summed up the situation by saying "Manufacturers have so darned many other worries that they refuse to consider new equipment as long as their 25-year-old machines will still run."

Modernize Own Plants

Aggressive tool builders are of course aware of this and are doing some good old fashioned selling to combat the problem. The board chairman of one lathe making firm says his answer is tied up in one continuous process—keep your machines up to date, find out what the customer needs to do a better job, then sell it to him.

His program isn't new but it does call for an aggressive spirit and willingness to take a chance. It means tool builders who want to keep up with the market are fighting obsolescence in their own shops. Shrewd operators are putting past balance sheets behind them and are worrying about tomorrow. The effort usually results in streamlined production systems, extensive research and increased capital investment.

Capital investment has a dual meaning for sales minded tool builders these days. It applies to modernization of their own plants first of all—but it is also part of a larger sales campaign. Today most machine tool builders are actively attempting to persuade their customers to set aside a capital reserve for the rainy day that calls for increased productivity.

The industry generally is hoping Washington can provide the stable environment needed for such long range planning. Currently most builders think of excess profits tax and the Vance plan when Washington is mentioned.

Machine Tool Sales Cycle

Boom

1942	$1,320,000,000
1943	$1,180,000,000
1944	$497,000,000
1945	$423,700,000

Bust

1946	$334,800,000
1947	$306,000,000
1948	$288,450,000
1949	$249,150,000

Won't Fit Pattern

Builders who want to see EPT dropped say their industry can't be fitted to a formula which searches for a normal period. To substantiate this reasoning they single out statistics which show total industry shipments dropping from $1,329,000,000 to $249,150,000 in the period from 1942 to 1949.

The trade generally is at a loss in defining excess profits. One large firm with annual sales totaling millions of dollars reportedly rings up excess profits as soon as the blue profit line climbs above $25,000.

Seek Export Markets

Industry's interest in adoption of the Vance plan isn't entirely selfish either. Those producers who have had to quadruple production in emergency periods want the plan adopted as a defensive measure. They feel it will introduce an element of economic stability and facilitate planning. Elimination of wild emergency buying sprees should also curtail cancellation waves and save tax dollars, tool builders say.

Machine tool builders interested in collaring the foreign market are also hoping for a firm government policy in the issuance of export licenses. They think their tools will find a home across the waters if builders have more freedom to sell and most aren't afraid of competition from that quarter.

Is a sane middle-of-the-road policy in the making? Machine tool builders generally believe it is. Their optimism is based on belief that the present Administration is willing to listen to reasonable argument and to cooperate. In other years, according to one tool builder "We were tolerated but ignored."

April Lay-Offs Low

Factory and industrial plant lay-offs dropped in April to the lowest rate since 1945, according to Bureau of Labor Statistics.

At the same time, reflecting the more favorable employmen' picture, voluntary quits have continued to rise over the past year.

Only nine out of every 1000 on manufacturing payrolls were laid off during April but workers were leaving their old jobs for new ones at a rate of 27 per 1000 workers.

INSTRUMENTS: Sales Down, Trends Up

First quarter total for scientific instruments drops from '52, still over '51 . . . Development stays ahead of demand . . . ODM boosts expansion target—By K. W. Bennett.

The first quarter 23 pct dropoff in scientific equipment sales seems to have no one in that industry worried. Producers of mechanical measuring devices, electronic measurement equipment, scales and balances, measuring and dispensing pumps point out 80 pct of the instruments produced today are sold to about 65,000 companies. Some 185,000 other companies remain as a potential market not yet fully explored.

Industry is Confident

And 1953 first quarter sales are still higher than the 1951 rate. The historical curve is still climbing. Sales in 1939 were only 16 pct of their 1951 level. Total was $1,417,045,000 in 1951. This does not include optical instruments, photo equipment, watches and clocks.

Instrument makers are confident, find old markets still strong with markets for newer equipment constantly opening. An example of their confidence was the recent announcement by a midwestern firm that it has developed a packaged unit for measuring the reaction in industrial atomic piles.

The fact that there are not yet any industrial atomic piles was no deterrent. The equipment is designed, tested, and will be marketed when the market's ready.

Uses Grow Rapidly

This early bird is not alone. A number of firms have given their research and development departments go ahead signals on equipment for which, thus far, industry can offer few if any applications. The builders are confident that when the equipment is ready, there will be a market for it.

Developments that are moving rapidly into the industrial field include: Hypersonics, high frequency sound being used experimentally to clean metal surfaces and small parts, mix powdered metals, and in emulsifying tests.

Electronic process control, or automatic process control, make use of automatic electronic or mechanical devices. These units actually control the manufacturing process, measure errors, correct for the error, signal when the process is again in the proper balance.

Firm Builds Own Tester

Thus far, automatic process control has been applied chiefly in the liquid-processing industries, as petroleum, plastics, and chemicals. Through the use of servo-mechanisms, a kind of remote control muscle, one operator can operate a number of instruments from a central station. Or the measuring instruments alone can do the job.

Testing Instruments Growth

Pct of Increase in Value of Products Shipped 1939-51

Scales & Balances	442%
Measuring & Dispensing Pumps	198%
Electrical Measuring Instruments	455%
Scientific Instruments	665%
Mechanical Measuring Instruments	628%
TOTAL	510%

X-ray and electron microscope testing have been with us for some time, but are just beginning to be explored by large segments of industry. One sheet fabricating firm even made its own x-ray thickness tester last year, using an old dental x-ray unit.

Several industrial models are in the works, or are already in the marketing stage. The trend now is to lighter, more portable equipment, of greater power.

The potential uses of "scientific apparatus" in industry are increasing almost hourly. And industry seems aware of this, as well as the government. In November, 1952, the Office of Defense Mobilization announced a $45 million expansion goal for the scientific instrument industry.

Last week, a revised goal of $100 million in capital expansion was announced, or an increase of $55 million over the old desired increase. The target date for completion of this program is January, 1956. Since the end of 1952, $24 million worth of expansion has already been undertaken. Certificates of necessity can still be issued for $31 million of fast tax writeoffs for remaining desired expansion.

Foreign Types Compete

While the industry has expanded in number of workers from 52,451 in 1939 to 172,305 in 1951, and value of shipments rose from $455,463,000 in 1939 to $2,459,286,000 in 1951, the picture is not entirely rose tinted.

As reported above, first quarter sales have fallen in 1953, though there seems to have been a leveling off in the more recent months. A heavy influx of foreign testing and experimental equipment has wooed away some potential purchasers of domestic equipment.

With the increasing availability of materials (with the exception of nickel and nickel-bearing alloys), deliveries can be speeded. And with the current influx of new equipment types, new markets can be created. These two factors will enable U. S. producers to give the foreign competitors a stiff fight.

Small Firms Pool Resources

Five member companies of a new small business production pool with headquarters in Minneapolis are in search of defense contracts for drop forgings, gray iron castings up to 8000 lb, sheet metal fabrication, and aircraft assemblies and components.

Small Defense Plants Administration says the pool, Federated Facilities, Inc., is also interested in supplying other parts.

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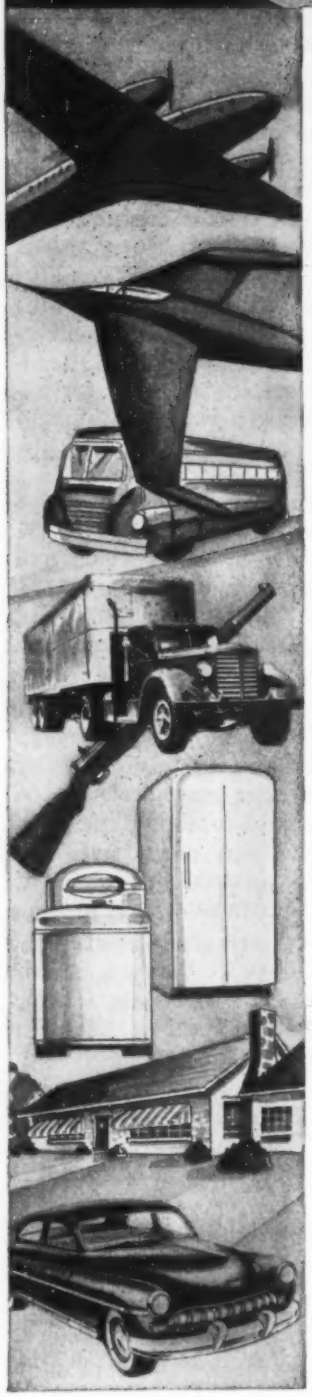

PAINT BONDING

"GRANODINE"® forms a zinc-iron phosphate-coating bond on sheet metal products—automobile bodies and fenders, refrigerator cabinets, etc.—for a durable, lustrous paint finish.

"LITHOFORM"® makes paint stick to galvanized iron and other zinc and cadmium surfaces.

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"PERMADINE",® a zinc phosphate coating chemical, forms on steel an oil-adsorptive coating which bonds rust-inhibiting oils such as "Granoleum."

"THERMOIL-GRANODINE"® a manganese-iron phosphate coating chemical, forms on steel a dense crystalline coating which, when oiled or painted, inhibits corrosion.

PROTECTION FOR FRICTION SURFACES

The oiled "THERMOIL-GRANODINE" coating on pistons, piston rings, cranks, camshafts and other rubbing parts, allows safe break-in operation, eliminates metal-to-metal contact, maintains lubrication and reduces the danger of scuffing, scoring, galling, welding and tearing.

IMPROVED DRAWING AND COLD FORMING

"GRANODRAW"® forms on pickled surfaces a tightly-bound adherent, zinc-iron phosphate coating which facilitates the cold mechanical deformation of steel, improves drawing, and lengthens die life.

Send for descriptive folders and Government specifications chart on the above chemicals. Write or call for more information on these products, and advice on your own metal-working problem.

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—Expansion—

SHEETS: Shipping Ra

Flat-rolled shipments double since 1940 . . . Pressure stays on . . . More capacity coming.

Phenomenal growth of the flat-rolled steel market has forced producers to more than double their rate of shipments since 1940. And yet demand continues to outrun supply.

Shipments in the first quarter of this year were at the annual rate of 32.7 million tons, compared with actual shipments of 15.3 million tons 13 years ago. In 1950, shipments of these products totaled 30 million tons; in 1951, 31 million tons and last year 25.6 million tons, despite the 54-day steel strike.

Relief Late in '53

Products involved are hot and cold-rolled sheets and strip, blackplate, tin and terne plate, galvanized and enameling sheets, electrical sheets and strip, and miscellaneous coated products.

Should demand continue at current levels, consumers can look for no substantial relief until late this year. Steel producers are bringing in more flat-rolled capacity, and more is under construction. But most of this will not make itself felt until late this year and in 1954.

New hot strip-sheet mills were started up in the last several weeks by Armco Steel Corp. (IRON AGE, May 28, 1953, p. 72) and Pittsburgh Steel Co. (June 4, 1953). The 80-in. Armco mill, with a monthly capacity of 150,000 tons, is expected to be in regular production by the end of second quarter.

The 66-in. Pittsburgh Steel Co. unit, with a potential monthly ca-

Trend of Flat-Rolled

1950 Shipments

Sheets—17,073,073 tons
Strip — 4,178,503 tons

1951 Shipments

Sheets—17,811,693 tons
Strip — 4,282,981 tons

1952 Shipments

Sheets—14,108,154 tons
Strip — 3,551,328 tons

mbs Sharply

pacity of 50,000 tons, will probably not be in full production before the end of the year due to a bottleneck in soaking pit capacity for ingots.

Other Mills Coming In

Armco also is planning to construct a new cold mill but the scheduled completion date is indefinite.

Other sheet mills under construction but not expected to contribute much tonnage until late this year or early next include hot and cold-rolled sheet mills at the Fairless Works and the Indiana Harbor plant of Youngstown Sheet & Tube, where a 56-in. cold mill with a rated capacity of 40,000 tons per month is expected to get into production early next year.

Portsmouth Steel Div. of Detroit Steel Corp. last August brought into production a new 54-in. hot mill, and last January a new cold-rolled sheet-strip mill.

Why Autos Take Most

The industry's No. 1 consumer of sheets and strip is the automotive industry and suppliers. These American Iron & Steel Institute figures on steel shipments show why:

Of total flat-rolled shipments in 1950, sheets accounted for 56 pct, strip 14 pct; in 1951, 59 pct and 14 pct, and in 1952, 56 pct and 14 pct.

Another large consumer, the appliance industry, used 1,208,305 tons of sheets and 141,592 tons of strip in 1950; 1,093,828 tons of sheets and 126,831 tons of strip in 1951, and 794,307 tons of sheets and 96,103 tons of strip in 1952.

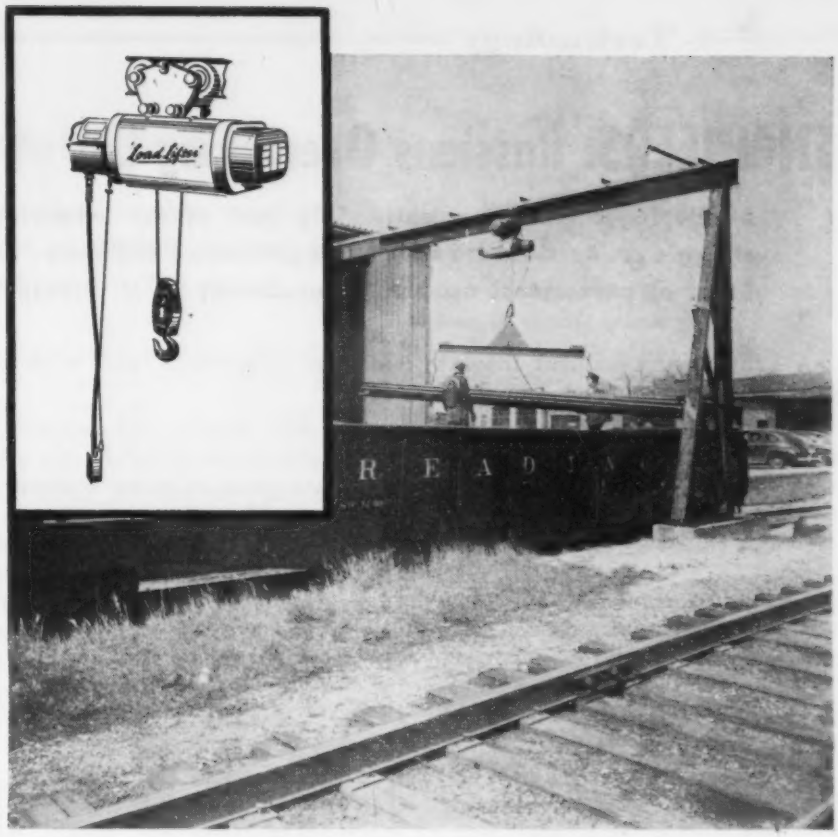
Shipments and Consumption

Automotive Consumption

8,135,779—pct of total 47
1,383,538—pct of total 34

7,124,909—pct of total 39
1,253,029—pct of total 29

5,756,702—pct of total 40
1,111,019—pct of total 31



MAKES MORE LIFTS ON ALL SHIFTS...

'Load Lifter'® ELECTRIC HOIST

HIGH PRODUCTION COSTS **are frequently due to slow, tedious handling methods. The "Series 700" 'Load Lifter' Electric Hoist is fast and efficient. At the push of a button, the 2,000-lb size lifts its load one-half foot per second. One hand is always completely free to guide the load. No muscle fatigue, no injuries and time out. More units are handled per hour, economically.**

THE 'LOAD LIFTER' **is a rugged, heavy-duty hoist. Steel suspension, powerful synchronized load and motor brakes, heat-treated helical gears, non-fracturing hook—all contribute to dependable, safe service on the toughest jobs. For extra safety, there are only 24 volts at the push button.**

BOOST YOUR PRODUCTION **'round the clock. Get the operational and maintenance advantages of simple design. Invest in the time and effort-saving 'Load Lifter' Electric Hoist. Capacities: ½-ton and up; single and two-speed control. Ask your "Shaw-Box" Distributor for complete information or write for Bulletin 399.**

'Load Lifter'® ELECTRIC HOISTS

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' Industrial Instruments, and Aircraft Products.

ENGINEERS: Russians Overtaking Us

Developing engineers, scientists big part of the industrial struggle . . . Russians are harping on graduating engineers . . . Boast of phenomenal numbers of grads—*By R. M. Stroupe.*

A fighting man without the intricate weapons demanded by modern war is a sitting duck. War mobilization is not only a race to build up industrial might. It also involves adequate manning of programs of research and engineering development.

In the background of our industrial struggle with Russia is a competition perhaps just as important —the build-up of scientific and engineering manpower. Without heavy backlog of technical skills, the race may have started as a lopsided one but today our engineering graduate classes can be seen dwindling while Russian classes grow.

Russia Stresses Science

Reports of the Reds' aims and successes in developing skilled laboratory and production specialists must be viewed with skepticism and are difficult to appraise accurately. Two points are plain to see, though: (1) Russia in the past 10 years has boosted emphasis on educating scientists and engineers; (2) It can turn loose a high proportion of these trained personnel on the improvement of its war machine. Civilian output still doesn't count in Russia.

Washington wants to arouse serious public concern on the rising prominenoe of science in the Soviet Union. One federal agency, the National Science Foundation, says there is a "dangerous tendency" among our citizens to consider Russians as incapable of building so simple an item as a wheelbarrow without assistance.

How Many Red Grads

Primary occupation of NSF officials, as defined by NSF Director Alan T. Waterman, is that of "determining the nation's scientific policy with regard to research." Dr. Waterman says, the agency aids research by grants or contracts and awards, fellowships and scholarships.

The NSF director told a congressional group that in 1955 Russia will graduate twice as many engineers as will the U. S. His agency has taken note of a 1946 statement by one S. V. Kaftanov, chairman of the Committee on Higher Education in the Soviet Union, calling for the following results in a multiple-year program:

"In industry and construction it is planned to graduate 120,000 engineers and 347,000 technicians; in transportation and communication 24,000 engineers and 74,000 technicians."

In 1952 we granted the following degrees:

B.S. or B.A.—331,924

Master's or second professional — 63,461

Doctorates—7,683

Of the total above only the following number had graduated in the sciences:

	BS	MS	PhD.
Biological sciences	11,196	2,307	764
Engineering (all types)	30,549	4,091	529
Mathematics	4,721	802	206
Physical sciences (including chemistry, geology, metallurgy, and physics)	12,145	3,054	1,720
General sciences (otherwise undefined)	4,440	269	11

By contrast, U. S. colleges and universities last year gave 331,924 persons baccalaureate degrees and 7683 doctorates. Fewer than 1 in 10 of those receiving their initial B.S. degrees, or 30,549 persons, had majored in engineering. This year 21,000 engineers will graduate. Defense and civilian needs are estimated at 42,000.

Gaining their B.S. degrees in scientific subjects last year were 12,145 students in the physical sciences (including chemistry, physics, metallurgy, and geology); 11,196 in biological sciences; 4721 in mathematics; and 4440 in general sciences, otherwise unclassified.

Job Bait's Attractive

Unfortunately too many talented students leave the campus before completing the advanced study and winning the doctorates needed to equip them for high-powered research.

NSF finds the attractiveness of job offers for holders of a B.S. in science or engineering persuades many to end their formal education early. Others have participated in ROTC programs and go into active military service soon after receiving the initial degree. Once in uniform, they may or may not be able to continue their training under auspices of the armed forces.

Whatever the reason—good job prospects, military commitments, declining numbers of students because of the low birth rate during the depression, or lack of interest —graduate schools are not operating at full capacity.

The Office of Scientific Personnel, National Research Council, says such schools have "facilities and staff to accept nearly 8000 more students for doctoral studies and about 11,400 more students for work towards the master's degree in science."

Interest Is Growing

Success of NSF efforts to build interest among young people in studying scientific and engineering curricula is not easy to evaluate at this time. The agency's fellowship program for study in sciences is only about a year old, and the first group of participants is just completing a year of study.

However, NSF speaks of an "increasing interest" in advanced scientific training among the colleges and within student ranks. It also notes that a good proportion of fellowship awards are for first-year graduate study, and therefore are likely to encourage the students to proceed on to more advanced science degrees.

STEEL: Europe Eyes Export Markets

West Europe's steelmakers, fearing possible overcapacity, hope exports will absorb excess . . . Steady demand growth in underdeveloped countries indicated in ECE report.

Like U. S. steelmen who are beginning to fidget about the prospect of being able to make more steel than they can sell, some European producers are wondering about their future markets.

They are especially concerned about export prospects. In prewar and postwar years exports of West European producers have accounted for more than 20 pct of output, compared with U. S. exports of little more than 5 pct of production. Countries such as Belgium and Luxembourg are almost completely dependent on outside markets, exporting more than 70 pct of their steel. Germany and the United Kingdom ship out one-sixth.

As in the past, European producers are weighing their export chances, wondering if foreign markets can be counted on to serve as an overcapacity safety valve.

Expect Steady Increase

If the United Nations' Economic Commission for Europe is right in its analysis of steel demand in non-European countries during the next 7 years, West Europe's steelmakers can expect a steady, though not spectacular, increase in demand from these markets.

The ECE report shows that West Europe's steel exports to non-European countries averaged 9 million tons between 1949 and 1951, reaching a high of 11.3 million tons in 1951. Assuming that steel consumption will increase in line with industrial expansion programs planned by various countries, ECE believes West Europe may be able to export 13.1 million tons of steel by 1960.

Though an increase in steel exports of 1.8 million tons from 1951 to 1960 seems trivial in terms of American production rates, to West Europe it represents a 16 pct jump in exports.

The ECE report does not analyze future steel exports among West European nations, but a general downward trend in intra-European steel traffic is reported. ECE singles out the industrially underdeveloped countries in Africa, the Middle East, Latin America, Asia and the Far East as markets which West Europe should try to expand.

The U. S., Japan and the Soviet Union have at times been substantial importers of European steel, but demand from these countries is too erratic, ECE states.

Rapidly developing countries such as Australia, Canada, South Africa and New Zealand have provided regular markets for European steel, but demand from these nations may drop sharply when their current steel expansion programs are completed.

Criticize Exporters

Since the war, West Europe has regained its dominant position as the world's leading steel exporter, supplying 80 pct of the steel imported by underdeveloped countries. But ECE points out that European producers have not had much competition in these markets in the last 2 years.

This situation may change as Japan and perhaps the U. S. make stronger bids for a larger share.

Europe's chances of maintaining its 80 pct hold on markets in underdeveloped countries depend on its ability to produce quality steel at low cost, but ECE also criticizes two practices of European steel exporters which it believes could mean loss of export markets.

The Commission warns that European steel prices must be determined by production costs and not be arbitrarily skyrocketed or slashed during periods of high or low demand as has been past practice. Steel exporters are also slapped for cutting down shipments to regular customers to meet exceptional demand from irregular buyers such as the U. S. and Japan.

Give Italy Funds for Jet Parts

Mutual Security Agency last week issued procurement authority to Italy to buy $3.5 million worth of machinery and equipment from the U. S. for use of the Fiat Co. in producing turbojet parts.

Included in the program will be $2.5 million worth of American-made machine tools and $450,000 worth of other metalworking machinery and equipment.

A total of nearly $170 million worth of authorizations was made last week, the largest for some time.

Italy was also authorized to purchase $5 million worth of copper and copper products from western nations, half of which would be bought in the U. S.

Britain Seeks New Gas Sources

England is planning to start a large scale search for natural gas. Discussions are now being held by the Gas Council (governing body of the nationalized gas industry) and the Anglo-Iranian Oil Co. to work out plans for explorations in England which will be conducted over a 5-year period.

Increases in the gas industry's coal and freight bill have amounted to $50 million per year during the last 18 months and this rise in cost has added impetus to the industry's interest in alternative sources of gas supply.

RADIO: Fight for Freer Airways

Manufacturers ask FCC for greater freedom in use of radio communications . . . Are now unable to use radio control if trucks are on public property—By *R. M. Stroupe.*

Faster, more efficient industrial production may result if the Federal Communications Commission acts favorably on a request made by manufacturers for greater leniency in regulations covering driver-dispatcher radio communication.

The appeal to FCC was made by the Committee on Manufacturers' Radio Use, which represents 70 varied manufacturing companies. The group is not asking for more radio frequencies, but hopes that FCC will grant them greater freedom in the use of existing frequencies. For FCC, however, the request is regarded as equivalent to a plea for more frequencies.

Despite this point of contention, FCC is not ignoring the complaint that the governing rule "imposes a rigid and unrealistic restriction upon the use of radio as an aid to manufacturing operations." This complaint is based in part on the banning, in metropolitan areas, of dispatcher-driver radio communication when trucks and other vehicles move along or across public property. Described in the appeal are a number of case histories in which industry is certain time, labor and money could be saved if more leniency were permitted in the use of radio communications. Some of the examples cited are:

A medium-size steel producer centers its operations in a long, narrow yard adjacent to a public highway. In moving from one end of the yard to the other, and in hauling slag to the dumping grounds, yard trucks have to use the highway. The company argues that, if FCC would shelve its present restriction on radio use when trucks are on public highways, truck operating costs could be cut.

A manufacturer of jet engine components makes and stores its products in several buildings in one city. These facilities are separated from the main plant, though a functional relationship applies to the entire group.

The firm can control its materials flow by radio only within a single yard area. Radio control of the flow between the main area and outlying buildings, company officials say, could raise productivity of some of its employees and part of its equipment by 50 pct.

IRON & STEEL: March Output By Districts

As Reported to the American Iron and Steel Institute

BLAST FURNACE —NET TONS DISTRICTS	Number of Companies	Annual Capacity	PIG IRON March	PIG IRON Year to Date	FERROALLOYS* March	FERROALLOYS* Year to Date	TOTAL March	TOTAL Year to Date	Pct of Capacity March	Pct of Capacity Year to Date
Eastern	12	16,312,990	1,231,510	3,486,644	27,331	80,314	1,258,841	3,566,958	90.8	88.7
Pitts.-Yngstn.	16	28,643,120	2,430,655	7,018,943	32,407	117,234	2,463,062	7,136,177	101.2	101.0
Cleve.-Detroit	6	8,633,800	732,437	2,108,559	.....	.....	732,437	2,108,559	99.8	99.0
Chicago	7	16,251,250	1,373,950	3,852,440	.....	.....	1,373,950	3,852,440	99.5	96.1
Southern	8	6,020,380	492,427	1,435,962	6,583	19,391	499,010	1,455,353	97.6	98.0
Western	3	3,518,700	350,061	1,003,775	.....	.....	350,061	1,003,775	117.1	115.7
TOTAL	34	79,380,240	6,611,040	18,906,323	66,321	216,939	6,677,361	19,123,262	99.0	97.7

STEEL —NET TONS DISTRICTS	Number of Companies	Annual Capacity	TOTAL STEEL† March	TOTAL STEEL† Year to Date	Pct of Capacity March	Pct of Capacity Year to Date	ALLOY STEEL March	ALLOY STEEL Year to Date	HOT TOPPED CARBON INGOTS March	HOT TOPPED CARBON INGOTS Year to Date
Eastern	24	23,863,810	1,965,129	‡5,633,708	96.9	95.7	176,184	504,524	433,723	‡1,213,371
Pitts.-Yngstn.	35	43,621,000	3,882,460	11,172,668	104.8	103.8	593,201	1,670,059	503,784	1,423,925
Cleve.-Detroit	8	12,002,900	1,005,364	2,820,584	98.6	95 3	87,629	250,912	90,975	265,142
Chicago	16	24,960,600	2,199,767	6,171,092	103.7	100.2	151,413	463,034	348,325	941,811
Southern	12	6,036,160	495,196	1,428,921	96.6	96.0	3,842	17,068	3,317	10,743
Western	12	7,063,000	620,182	1,771,868	103.3	101.7	13,020	35,648	25,934	77,603
TOTAL	86	117,547,470	10,168,098	‡28,998,839	101.8	100.0	1,025,289	2,941,245	1,404,058	‡3,932,595

* Includes Ferromanganese, Spiegel and Ferrosilicon.
† Includes Alloy Steel, Hot Topped Carbon Ingots.
‡ Revised.

—Defense—

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Bomb practice, 58825, $410,451, The Electron Corp., Denver, Colo.

Bomb, practice, 58825, $417,481, Waycross Machine Shop, Waycross, Ga.

Wire rope clips, 88540, $56,495, St. Pierre Chain Corp., Worcester, Mass.

Powder tanks, 9000, $299,970, Beatrice Steel Tank Mfg. Co., Beatrice, Neb.

Submarine mine cable, 450000 ft, $314,100, Simplex Wire & Cable Co., Cambridge, Mass.

Detonating fuzes, 224050, $1,543,407, Lion Mfg. Co., Chicago.

Gasoline booster pumps, 16 ea, $61,446, Walter H. Eagan Co., Inc., Philadelphia.

Parts for 90 MM gun, 6120, $133,681, Firestone Tire & Rubber Co., Akron, Ohio, *C. D. Smith.*

Borescopes, 20, $64,550, Eastman Kodak Co., Rochester, N. Y.

Rotor, 980,000, $83,377, Airtex Products, Inc., Fairfield, Ill.

Spare parts, lot, 229,962, Diamond T Motor Car Co., Chicago.

Arming delay mechanism, 80000 ea, $227,600, Webster Chicago Corp., Chicago.

Plate, 2500, $80,452, Borg-Warner Co., Rockford, Ill.

Cartridge, ignition, 3100000, $248,000, Federal Cartridge Corp., Minneapolis.

Primer, percussion, 772000, $179,104, Langsen Mfg. Co., Chicago.

Primer, percussion, 1400000, $336,000, Langsen Mfg. Co., Chicago.

Fin, shell, 885300 ea, $428,582, Line Material Co., Milwaukee.

Truck, prime mover, 11, $191,833, Diamond T. Motor Car Co., Chicago.

Miscellaneous trucks, 1288, $3,227,804, International Harvester Co., Chicago.

Cartridge storage case, 1800000, $4,758,120, Conco Engineering Works, Mendota, Ill.

Truck, dump, 10 ea, $159,818, The Euclid Road Machine Co., Cleveland.

Paving machine, 4 ea, $54,192, Barber-Greene Co., Aurora, Ill.

Spare parts, var, $96,709, General Motors Corp., Cleveland.

Cradle assy, 200 ea, $260,480, Parish Pressed Steel Co., Reading, Pa.

Mounts, tripod, 4269 ea, $926,396, Birtman Electric Co., Chicago.

Kit-stud driver & remover, 897 ea, $63,687, Kalon Mfg. Co., Brooklyn.

Bearings, 160644 ea, $144,827, General Motors Corp., Bristol, Conn., *L. A. Lansing.*

280 MM gun carriage, 52067, Threadwell Const. Co., Midland, Pa.

Fin, shell, 182066, $380,000, LeJohn Mfg. Co., Huntington, W. Va.

Revolvers, lightweight, cal. 38, 2541, $83,192, Smith & Wesson, Inc., Springfield, Mass.

Primer, percussion, 2035000, $596,865, Bridgeport Metal Goods Mfg. Co., Bridgeport, Conn.

Pumps, dispensing bulk, 600, $56,862, O'Neill Mfg. Co., Kalispell, Mont.

Replenishment of combat motor vehicle parts, 2400, $131,904, General Motors Corp., Indianapolis, *H. S. Bowden.*

HANDLING HELPS

by A.L.L.

What a drag!

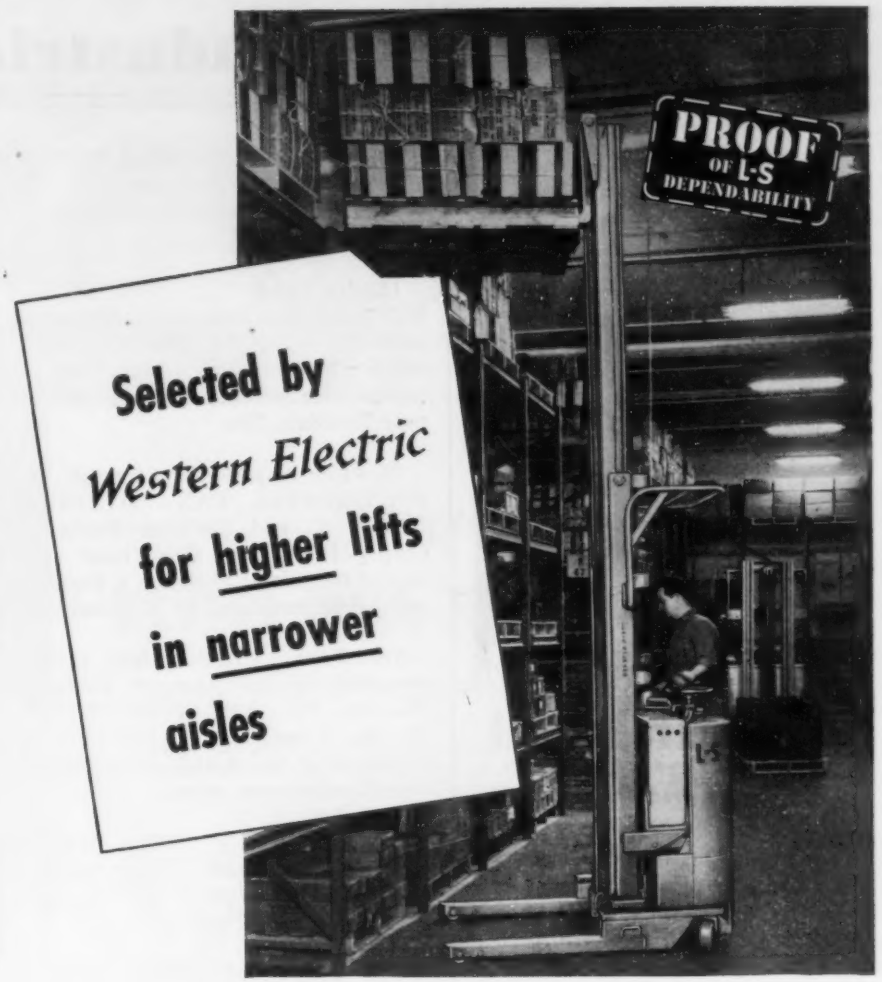
Floor trucks are helping to reduce warehouse and terminal handling costs when used to supplement their power equipment. An interesting installation

of this type is the use of floor trucks with dragline conveyors. The Lewis-Shepard Trucks illustrated were designed for just such work. L-S caster alignment and hanger mounting of main wheels eliminate weaving . . . assure a steady course at all times. Push bar permits manual handling when truck is not attached to conveyor. Write for full story.

Lazy man's delight!

For fast movement of skid or pallet loads in confined quarters, there's nothing like the Lewis-Shepard Electric Low Lift Model "M", shown here at work for Western Electric. Timed acceleration picks up speed quickly, smoothly. Braking is integrated with

speed control . . . and all controls fit right in the palm of one hand. The "M" comes in pallet and platform models to 4000 lbs. capacity. It carries both load and operator for long periods of dependable hauling. *For more information write Lewis-Shepard Products, Inc., 515-6 Walnut Street, Watertown 72, Massachusetts.*



How would you like to cut down your wasted floor space and, at the same time, increase your stacking heights?

Western Electric Company Planning Engineers are doing just that. In many of their Distributing Houses, aisles have been narrowed to 7′ wide and stacking heights increased to 176″. Before proceeding, however, it was necessary to find a 3000 lb. capacity Fork Lift Truck to meet these exacting requirements.

After many exhaustive tests, Western Electric engineers tried Lewis-Shepard SpaceMaster Model "M's". The "M's" gave the truck stability required in their high-stacked, narrow aisle warehouses.

High stacking stability means faster, more efficient operation, of course, but even more important, it assures safer handling.

Why is the Model "M" more stable? An exclusive L-S design has made it possible to introduce two rugged stabilizing casters under the load carrying frame of the truck. These two additional points of support distribute the weight and greatly increase stability under high, heavy loads. Rigid channel masts are another important high lift stability factor.

COMPARE THE FACTS! Ask for Riding Type Electric Truck Comparison Chart and prove to yourself that Lewis-Shepard is your best buy.

Nationwide Service — See "Trucks, Industrial" in your Yellow Phone Book

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- Model "M" Catalog
- Riding Type Electric Truck Comparison Chart

Name.....

Company.....

Street.....

City..... State.....

Bowser Cold Treatment

. . . Makes good products better

One of the most dramatic recent developments in the making of better metal products has been the use of cold treatment.

To help you take full, economical advantage of this new process, Bowser Technical Refrigeration now has available a line of standard units. These new units, with ranges from −50°F to −200°F (or lower), have countless applications in the production of superior metal products.

Bowser cold treatment can help you:

- *Increase cutting tool life as much as 500%.*
- *Eliminate distortion and cracking resulting from grinding.*
- *Permanently stabilize dimensions of precision parts, gages and tools.*
- *Improve expansion fitting, salvage out-of-size dies.*
- *Increase hardness and lengthen life of carburized alloy gear steels, blanking and forming dies, etc.*

Bowser will be glad to cold treat your sample parts, tools or products — without cost or obligation.

Write For Details

BTR *BOWSER TECHNICAL REFRIGERATION*

Industrial Briefs

Time Flies . . . SUPERIOR METAL PRODUCTS, INC., Marion, Ind., is celebrating its twentieth anniversary this year.

Lignite Drier . . . RUST ENGINEERING CO., Pittsburgh, will build extensive drying facilities for lignite which will be used as a major power source for a smelting plant for Alcoa near Rockdale, Tex.

Directors Approve . . . Officials of CONTINENTAL CAN CO., INC., New York, and Shellmar Products Corp., Mt. Vernon, Ohio, have approved the sale of Shellmar, a flexible packaging business, to Continental.

Year Term . . . R. B. Nichols, president and general manager, Bantam Bearings Div., THE TORRINGTON CO., South Bend, Ind., has been elected president of the Anti-Friction Bearing Manufacturers Assn.

New Quarters . . . FIRTH STERLING INC. has a new Chicago district office and warehouse at 3415 North Avenue, Melrose Park, Ill.

New Arm . . . ADAMAS CARBIDE CORP., Harrison, N. J., has appointed Specifax Corp., 555 E. Walnut St., Pasadena, Calif., as its sales representative in California.

Major Development . . . KENNECOTT COPPER CORP. will develop a new open-pit copper mine in Nevada.

Re-Entering Field . . . FRUEHAUF TRAILER CO. has re-entered the haulaway trailer field with establishment of a Haulaway Trailer Div. at its Detroit headquarters.

Coast-to-Coast . . . Cooper Precision Products, Los Angeles, will become a wholly-owned subsidiary of STANDARD PRESSED STEEL CO., Jenkintown, Pa.

Underway . . . U. S. STEEL CORP. started production of iron in the second of two new blast furnaces with the first cast of the Hazel Furnace at the Fairless Works, Morrisville, Pa., recently.

Becomes Subsidiary . . . MINNESOTA MINING & MFG. CO. has acquired, through a $5 million stock transfer, American Lava Corp., Chattanooga, Tenn.

New Division . . . LAKE ERIE ENGINEERING CORP., Buffalo, has established a Rolling Mill & Special Products Div. for the supply of a broad line of auxiliary rolling mill equipment for ferrous and nonferrous metals.

New Quarters . . . BULLARD CO. has moved its Cleveland district office to 16828 Kinsman Rd., Shaker Heights, Ohio.

Acquired . . . THOR CORP., Chicago, has acquired Century Vitreous Enamel Co., Chicago.

Hartford Office . . . ALLIS-CHALMERS MFG. CO., General Machinery Div., has established a new district office in Hartford, Conn.

South of the Border . . . THE FOXBORO CO., Foxboro, Mass., has established a new instrument firm in Mexico, Graficas e Instrumentos, S.A.

Car Ferry . . . WESTINGHOUSE ELECTRIC CORP. will supply electrical propulsion equipment for a million-dollar diesel-electric car ferry for the San Diego & Coronado Ferry Co., San Diego.

Painesville Plant . . . GENERAL CHEMICAL DIV., Allied Chemical & Dye Corp., disclosed the second major expansion decision in recent weeks in its sulfuric acid production facilities. It plans to build a new acid plant at Painesville, Ohio.

Re-Location . . . YORK ENGINEERING & CONSTRUCTION CO. and York-Gillespie Mfg. Co., Pittsburgh, have re-located their fabricating shops, machine shops, general offices and engineering departments in one plant at 39th St. and Allegheny Valley R. R.

Opens Office . . . SANDVIK STEEL, INC., New York, has opened an office at 3609 East Olympic Blvd., Los Angeles.

Front-Line . . . WILLYS MOTORS, INC., received its first production order, a $3 million contract, for a new jeep ambulance.

New Dealership . . . CLARK EQUIPMENT CO., Battle Creek, Mich., has appointed The Christy Equipment Co., Omaha, Neb., as a dealer.

Special

REVERE MILL TECHNIQUES

serve American Sanitary

Shown here are a few of the more than a thousand of American Sanitary plumbing goods made largely of Revere brass plumbers' tube. This tube is made by special techniques developed by the Revere Mills to assure easy fabrication into plumbers' items.

Almost every home in this great country of ours has plumbing. Most people never give a second thought to traps and bends and elbows, sink strainers, flanges and so on. But both Revere and American Sanitary Manufacturing Co., Abingdon, Illinois, think a lot about them. American Sanitary makes over a thousand such items for plumbing, and buys a great deal of Revere brass plumbers' tube, also hexagonal O.D., round I.D. heavy wall leaded brass tube for easy machining into fittings. The point about this long association between Revere and American Sanitary is that Revere uses special mill techniques to produce brass plumbers' tube. These techniques make it possible for American Sanitary to produce the bends, often at 180°, without cracking, without marring the finish. Thus nickel or chromium plating can be carried out successfully, and beautiful parts produced, the parts that householders admire, and which add to the value of both new and older houses. Thus, behind even the most taken-for-granted articles there is usually a lot of special skill and know-how. . . . If you would like to benefit from the capabilities of the Revere Mills, and of the Revere Technical Advisory Service, get in touch with the nearest Revere Sales Office. See your telephone directory, or write direct.

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Price-Cost Squeeze Hits Automakers

Industry caught between rising costs and public's demand for lower prices . . . Discounts off list common . . . Dealers cry woes over sales—By *R. D. Raddant.*

It's a little difficult to work up sympathy for an industry that is equalling or breaking all production records and in some segments appears to be headed for new earnings records this year.

Nevertheless, a fairly good case can be built that the auto industry is in a squeeze between rising costs and price resistance.

Some Cut Prices . . . General Motors and Ford are standing on a no price change platform. But only a short time ago Chrysler dropped prices about $100 on Dodge, Plymouth and Chrysler cars. And 2 weeks ago Kaiser Motors edged Henry J prices downward $100 and $125 depending on the model.

Hard-pressed sales forces in other auto companies are tossing out discounts right and left. And list price is a relative thing. Dealers have a margin of 24 to 26 pct to work on, so they can trim prices before the pain gets too acute.

Unhappy Dealers . . . Even so, dealers are doing more than usual amount of complaining. Plant sales executives worry about the trend, but are confident that some old time prewar merchandising would take up any slack that appears.

It's no secret that top auto executives feel the industry as a whole has not done a good job in training their dealers, softened by easy pickings in recent years, in the facts of life of competitive selling. A constant series of emergency dealer training programs in the industry evidences this.

But Costs Go Up . . . That's the case for lower prices. But at the same time labor and material costs are surging upward.

The industry is in the process of issuing an annual improvement factor raise of 5¢ per hr, hiking pensions, and increasing skilled labor rates 10¢ or 20¢ per hr.

Then there is the problem of increased steel costs. Most steel price boosts so far have been limited to extras, but these can result in sizable figures. It is almost impossible to compute what this means in cost for an individual car. Estimates range from $8 on a small car to as high as $15 for a luxury model.

Fear New Steel Rise . . . One automotive purchasing section estimates that steel purchasing costs increased as much as 3 pct with the boost in extras. Now the industry is expecting new price increases when the steel wage issue is settled.

Only bright spot is a falling off of premium steel buying. This should help counterbalance other steel price factors.

Not Worthless Junk . . . While discussing automotive steel costs, it might be worthwhile to point out that auto companies are reaping fat revenues from their scrap.

At present booming production rates, scrap coming from auto plants is probably at near record tonnages. In contrast to the slumping dealer scrap market, No. 1 automotive bundles still bring the old ceiling of $40.20 per ton.

Auto companies, incidentally, keep their scrap tonnage figures to themselves as much as possible. In a tight steel market they use it as a hole card in the poker game of steel procurement.

But some idea of the magnitude of automotive scrap can be obtained from scrap lists. This month, for example, Fisher Body offers 47,250 tons of No. 1 bundles and 6175 tons of new busheling from all plants. At $40.20 this means a return of $2,147,685 just for scrap, a tidy sum.

ACID LEVELS can be adjusted to compensate for temperature changes in Willard Storage Battery Co.'s new Weather Master battery. A plastic key is inserted in cells for adjustment.

Chevvy Out In Front . . . Some time this month Chevrolet will pass the 1 million mark for 1953 car and truck production. This will put the production leader far in front of the rest of the industry and ahead of its own 1950 record year.

In 1950 Chevrolet became the first auto producer to manufacture more than 2 million vehicles. At that time it broke Ford's 1923 record that had stood up against all previous challenges.

Can Do . . . In the first 5 months of 1953 Chevrolet produced 629,599 passenger cars and 185,306

trucks for a total vehicle count of 814,905. To reach 1 million will require a better than average rate, but T. H. Keating, Chevrolet general manager, says that present production rates will do it.

In comparison, Ford produced 413,254 cars and 112,337 trucks in the first 5 months. Ford has had two serious shutdowns because of supplier strikes while Chevrolet has escaped production troubles.

Transmission:

Chrysler to put fully automatic shift on some models.

Chrysler pulled a surprise on the industry late last week with a new fully automatic transmission for its Crown Imperial and Imperial models.

Up to now, the Chrysler semi-automatic transmission required a clutch pedal. The new transmission eliminates this by a torque converter mounted on the back of the crankshaft ahead of the transmission.

Other Models Must Wait

While it was known that Chrysler was working on the improvement, it was not expected to be used until the 1954 model season. Apparently Chrysler felt the intensely competitive situation in the luxury car bracket warranted the mid-season introduction.

Because of the monumental tooling task, the new transmission will not be ready for other Chrysler models or Dodge, De Soto, and Plymouth cars until the 1954 models.

Unusual Introduction

With the torque converter, the transmission has a single direct speed, multiple-disc clutch and two planetary gear sets. Price will be in line with other automatic transmissions. The unit is being manufactured at the company's Indianapolis plant.

The mid-year introduction, which is unusual to say the least, points out the lengths to which car makers are going to sustain the strong market through 1953. Chrysler could have ridden out the year, then come out with the transmission fresh with 1954 models.

Tough At Top

But it decided instead to give a shot in the arm to its top level cars, indicating that there will be no tendency to permit a last-half sales and production slump.

General rule is that when the market starts to slip, it starts at the top of the price scale. Competition is probably tougher here than even in the low price field. Cadillac, Lincoln, Packard, and Chrysler, with Buick and others edging into the expensive bracket, are all out to increase their share of the market.

Automotive Production
(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
June 6, 1953...	118,420*	17,737*
May 30, 1953...	110,201	15,667
June 7, 1952...	100,290	28,547
May 31, 1952...	99,101	28,658

*Estimated Source: *Ward's Reports*

Adaptable Wire Wheels on Market

The wire wheel, revived this season after two decades of oblivion, is apparently back in the market on a paying basis.

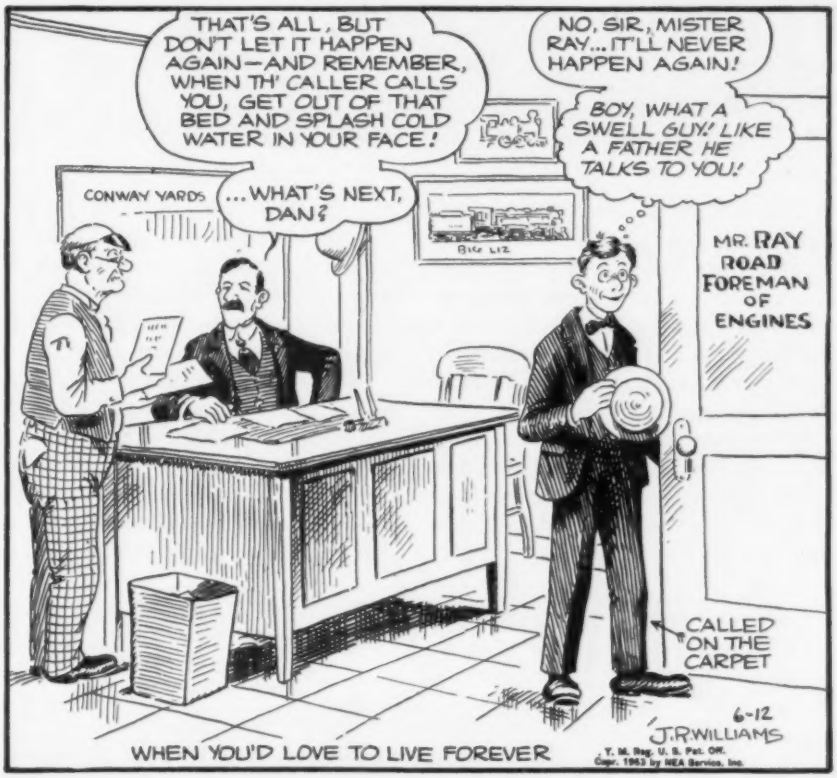
Motor Wheel Corp. has come out with wire wheels that can be adapted to fit most cars. They will be available to dealers for installation as original equipment or replacement wheels.

Up to now wire wheels could only be offered (factory installed) by a few car manufacturers. Motor Wheel's development will make the wheel more accessible to anyone who wants to pay the price for that extra touch.

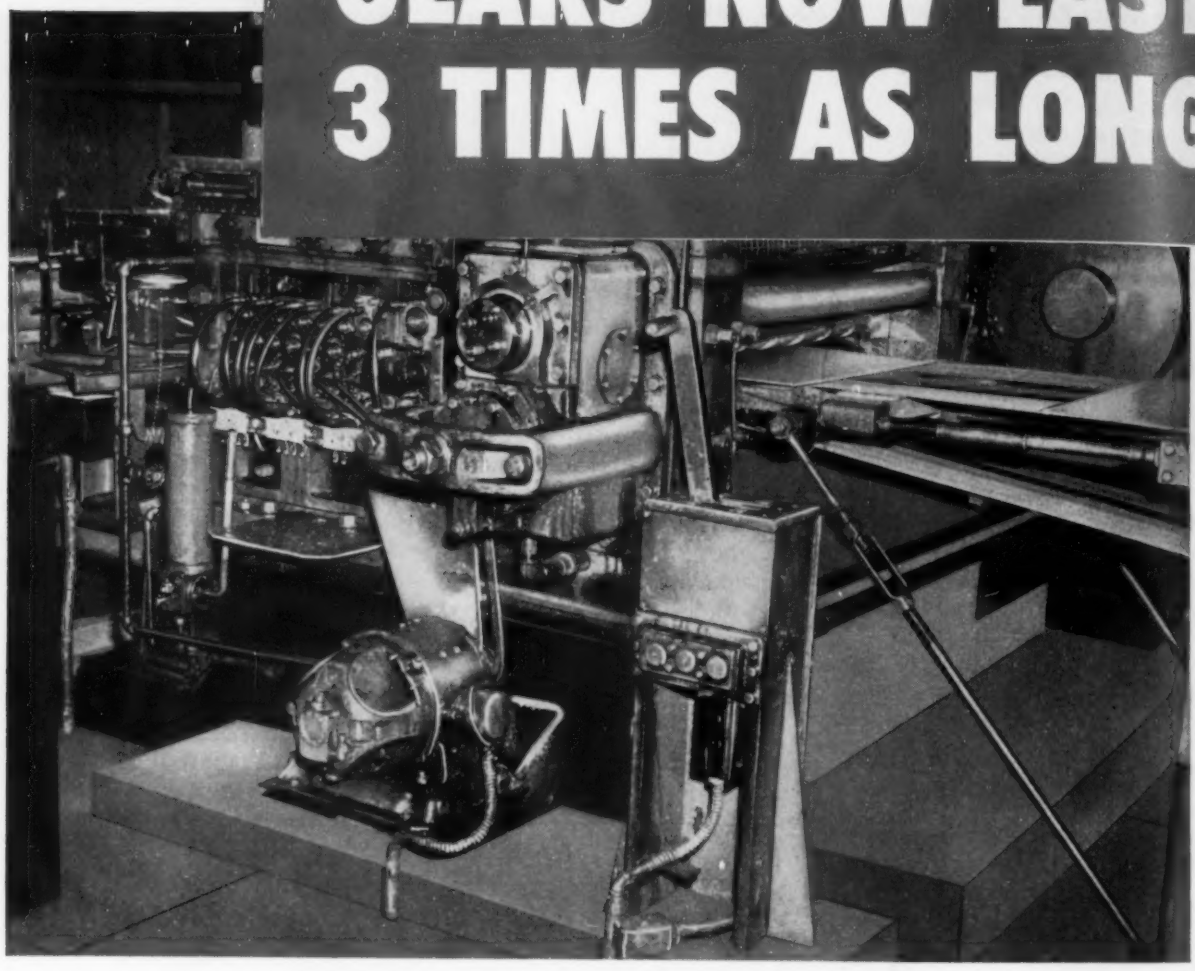
Genuine wire wheels are still very expensive, but clip-on wire covers are offered by several companies in a number of variations and prices.

Motor Wheel has two types of wire wheels to accommodate tire size. One design has all spokes laced into the well of the rim. The other design has one row of spokes located at the bead seat of the rim with the other in the well.

THE BULL OF THE WOODS By J. R. Williams


THAT'S ALL, BUT DON'T LET IT HAPPEN AGAIN—AND REMEMBER, WHEN TH' CALLER CALLS YOU, GET OUT OF THAT BED AND SPLASH COLD WATER IN YOUR FACE!
NO, SIR, MISTER RAY... IT'LL NEVER HAPPEN AGAIN!
BOY, WHAT A SWELL GUY! LIKE A FATHER HE TALKS TO YOU!
CONWAY YARDS
...WHAT'S NEXT, DAN?
MR. RAY ROAD FOREMAN OF ENGINES
CALLED ON THE CARPET
6-12
J.R.WILLIAMS
WHEN YOU'D LOVE TO LIVE FOREVER

WEIRTON'S SHEAR GEARS NOW LAST 3 TIMES AS LONG



The Situation: Weirton Steel Company, Weirton, W. Va., was having trouble with the gears of seven Hallden tin plate shears. Gears were pitting badly and running so hot that a continuous vapor rose from the vent. Gear life was only about five months.

The Remedy: A Texaco Lubrication Engineer was called in, asked to study the problem. He recommended *Texaco Meropa Lubricant* and the lubricant on one shear drive was changed over as a test.

The Results: Improvement in performance with *Texaco Meropa Lubricant* was so marked that within six months the other six shears were also changed over. The average life of the gears is now eighteen months.

Wierton's experience typifies the ideal protection *Texaco Meropa Lubricant* affords enclosed gears of every type. The EP properties of *Texaco Meropa Lubricant* are especially long-lasting and are not affected by high operating temperatures. *Texaco Meropa Lubricant* does not separate, thicken or foam. It is not affected by moisture. It is highly resistant to oxidation and non-corrosive to bearings.

Let a Texaco Lubrication Engineer give you all the facts. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

Congress 'Puts First Things First'

Crowded legislative docket forces some bills into scrap pile . . . Trade and taxes on must list . . . Internal Revenue gets axe . . . Junk consumer dollar study—By G. H. Baker.

Congressional leaders, chafing under their self-imposed timetable for adjournment by Aug. 1, are moving to "put first things first" in the crowded 6-week legislative schedule that lies ahead. As a result, a number of proposals that rated a high priority for action last January are now being forced into the legislative scrap pile.

Senate and House leaders have given "must" priority to two legislative proposals important to industry: (1) Extension of the excess-profits tax, and (2) extension of the foreign trade agreements.

Ike's Full Backing . . . The White House has made it clear to Senate Leader Taft and House Speaker Martin that it considers approval of these measures of paramount importance. And President Eisenhower is throwing the full weight of his prestige into the faltering congressional drive for enactment of these proposals.

Stricken from the "must" list of legislation, on the other hand, are two important points in Mr. Eisenhower's 1953 legislative program: (1) Revision of the Taft-Hartley law, and (2) U. S. cooperation with Canada in the development of the St. Lawrence seaway.

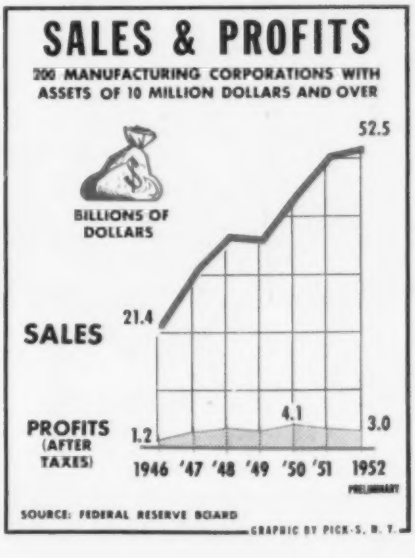
Decision to erase these two measures from the congressional docket still is unofficial, but may be regarded as authoritative. These issues are highly controversial, and Capitol leadership reluctantly concluded any insistence on a congressional showdown this summer would increase party disunity and delay action on other more important bills on jam-packed Senate and House dockets.

Compromise on EPT? . . . Definite possibility of a "compromise" extension of the excess-profits tax was raised at the Capitol last week. Some Republicans are coming around to the idea of writing relief provisions into legislation extending EPT through Dec. 31, 1953.

But congressional tax experts estimate that any EPT easing would result in cutting the government's "take" for the 6-month period July 1 to Dec. 31 from between $700 million and $800 million to not more than $300 million. This possibility then raises the question of whether the White House and the Treasury will consider this relatively small sum of revenue worth fighting for.

BIR Gets the Axe . . . Secretary of the Treasury Humphrey has approved reorganization of the Bureau of Internal Revenue reducing its regions from 17 to nine and trimming its Washington personnel by 25 pct. Mr. Humphrey estimates this will save taxpayers about $6 million annually.

District BIR offices, starting July 1, will be located in the following cities: Boston, New York, Philadelphia, Chicago, Atlanta, Dallas, San Francisco, Omaha, and Cincinnati. Offices are to be closed in Buffalo, Baltimore, Cleveland, Detroit, Louisville, Birmingham, St. Louis, St. Paul, Denver, Los Angeles, and Seattle.



Job's Being Done . . . Congress makes it clear it has little regard for a proposal made last year by ex-President Truman for a government study of the consumer's dollar. Both the Senate and House voted by wide majorities to forbid the Federal Trade Commission to make such a study.

Reasoning is that both the Labor and Agriculture Depts. are already in the business of providing cost-of-living statistics and consumer-spending data in detailed form.

Slow Vote on Rail Bill . . . Final approval by Congress of the so-called "automatic rate increase" bill still is a long way off, despite railroad pressure for quick enactment.

In its present form, the bill (S. 1461) would require the rate-making Interstate Commerce Commission to put into effect within 60 days any increased rates requested by the railroads. Such increases would become effective on an interim basis. If the permanent increases finally authorized by the ICC should be less than those granted on an interim basis, the railroads would be required to make refunds.

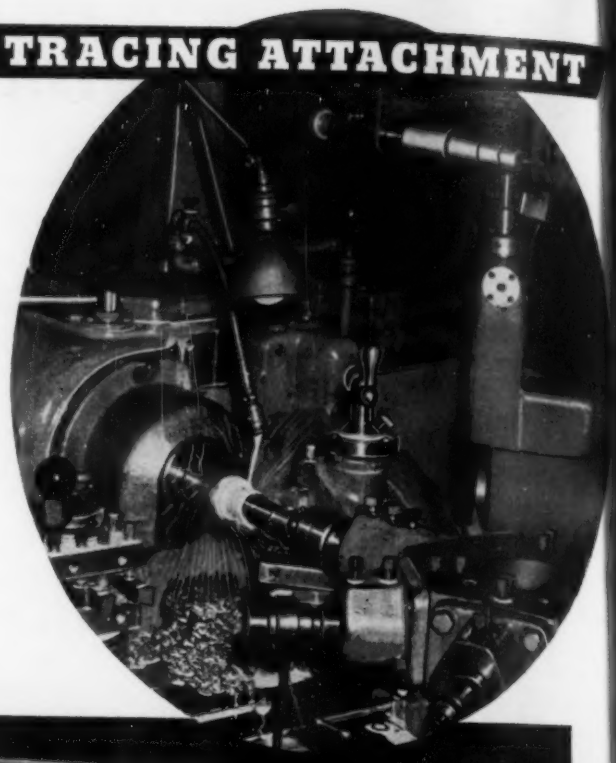
The Senate has approved the measure, but House plans for voting on the bill have not yet taken shape.

Railroads estimate they would have received $1.4 billion in additional revenue from 1946 to 1953 with higher rates requested.

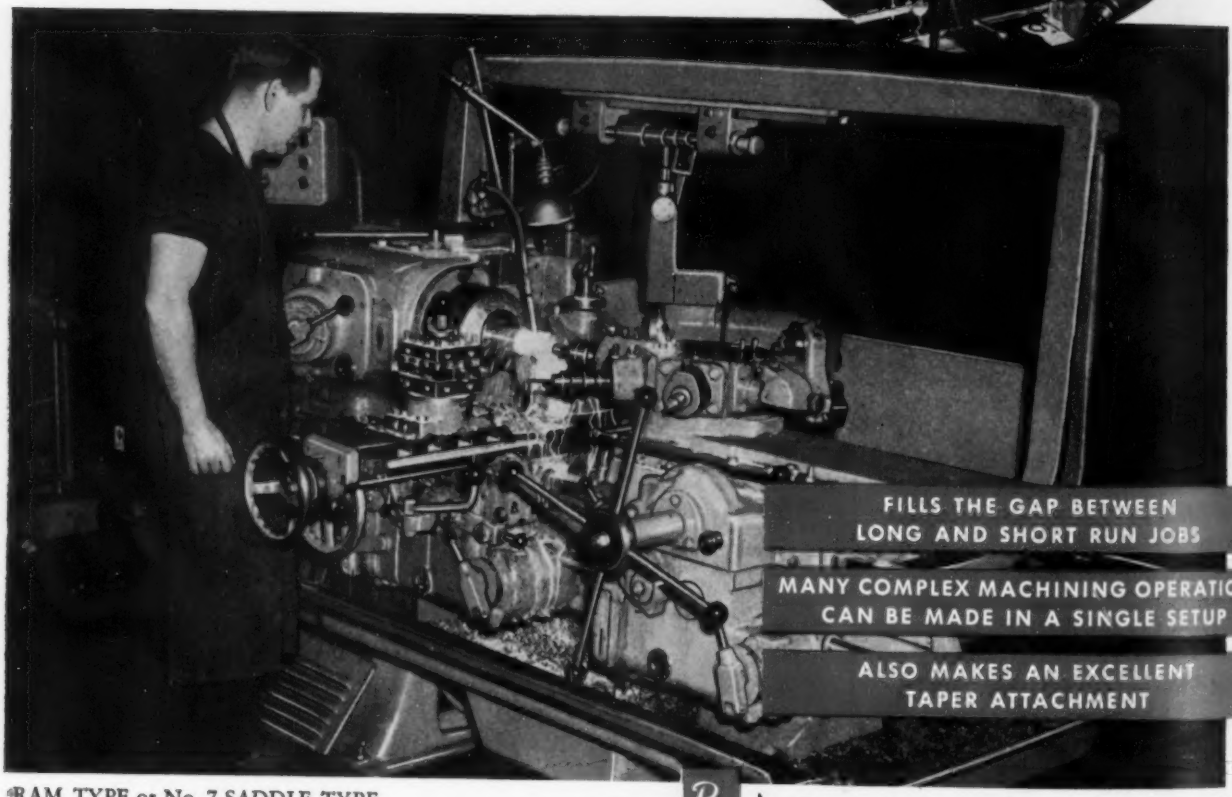
Keep Buying Tungsten . . . Congress indicates it intends to keep the Federal Government in the market for domestic tungsten for another 2 years. Legislation to extend the current buying program until 1958 has been approved by the House Interior Committee.

NEW HYDRAULIC TRACING ATTACHMENT

for J&L turret lathes*



Will reduce your costs — direct and indirect — by combining in a single machine all the advantages of TRACING for contour turning, boring or facing operations, with the advantages of multiple tooling and the many other time saving, cost saving features of J & L Universal Turret Lathes.



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*RAM TYPE or No. 7 SADDLE TYPE

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J&L TURRET LATHE DIV.

DEFENSE: Wilson Team Explains Cuts

Say budget cuts will not impair defense or security . . . Talbott argues for fully equipped wings . . . Army's Stevens says combat effectiveness is not injured—*By A. K. Rannells.*

Top defense officials last week had a heavier barrage of arguments against Air Force and Congressional opponents of defense budget cuts. They tried to hammer home that defense strength would not be weakened, that national security would not suffer.

Testifying before a Senate subcommittee, secretaries of the three military services supported their chief, Defense Secretary Wilson, in his attempt to lop $5 billion off defense. They indicated the proposed $36 billion plus would be enough if the world situation does not worsen.

"Can Equip 143 Wings"

Air Force Secretary Talbott maintains "aircraft procurement is still scheduled to equip 143 wings." The Defense Dept. is arguing that much of earlier appropriations have gone for build-up, getting output started and pipelines filled. Now more money can go into actual production.

Mr. Talbott and Mr. Wilson want to postpone building more bases, activating new wings until the ones we have can be fully equipped. They say it is better to set up 110 fully equipped wings by July 1954 and 120 or more by the end of 1955 than to partially equip 143 wings. Mr. Wilson would tighten up on new commitments until existing orders start catching up and lead time's reduced.

Air Force . . . It seemed last week part of the $3 billion air cut, if Congress approves it, would come from deferring work on at least seven new bases. Some would be accounted for by plane order deferment or cancellation.

There will be little cutback in combat types of craft—except B-47 trainers, some "deferment" for fighter bombers and day fighters while building up 114 to 120 wings.

Trainers, transports, and helicopters would definitely be hit. Good sources say that cancellations of non-combat craft may go as high as about 800—not as heavy (1200 planes) as first planned.

Industry sources in Washington hold that even under the revised budget the aviation industry generally would still have a 2 to 3 year backlog to lean upon.

Army . . . Mr. Stevens says the proposed reduction of $3 billion to $13.7 billion won't harm combat effectiveness. Army will spend $3.5 billion or more in hard goods, a substantial portion for ammunition.

Close to $2.5 billion of the cut will be absorbed by reduced cost of Korean combat. Army costs in Korea have been about $5 billion annually.

But combat strength has been built up, ammunition and other supplies stocked, pipelines filled. Mr. Stevens hopes that with requirements held to running operations, costs can be halved.

Remainder will be saved by trimming support strength (service troops), sharpening of procurement methods, deflation of civilian personnel levels, closing of six to ten installations on a standby basis.

Navy . . . Although the new budget figure of $9.6 billion is $1.7 billion under the Truman request, Secretary Robert Anderson says it will finance "a sound program."

This means continuation of combat operations and vessel strength at present levels. Ship modernization may have to be slowed down.

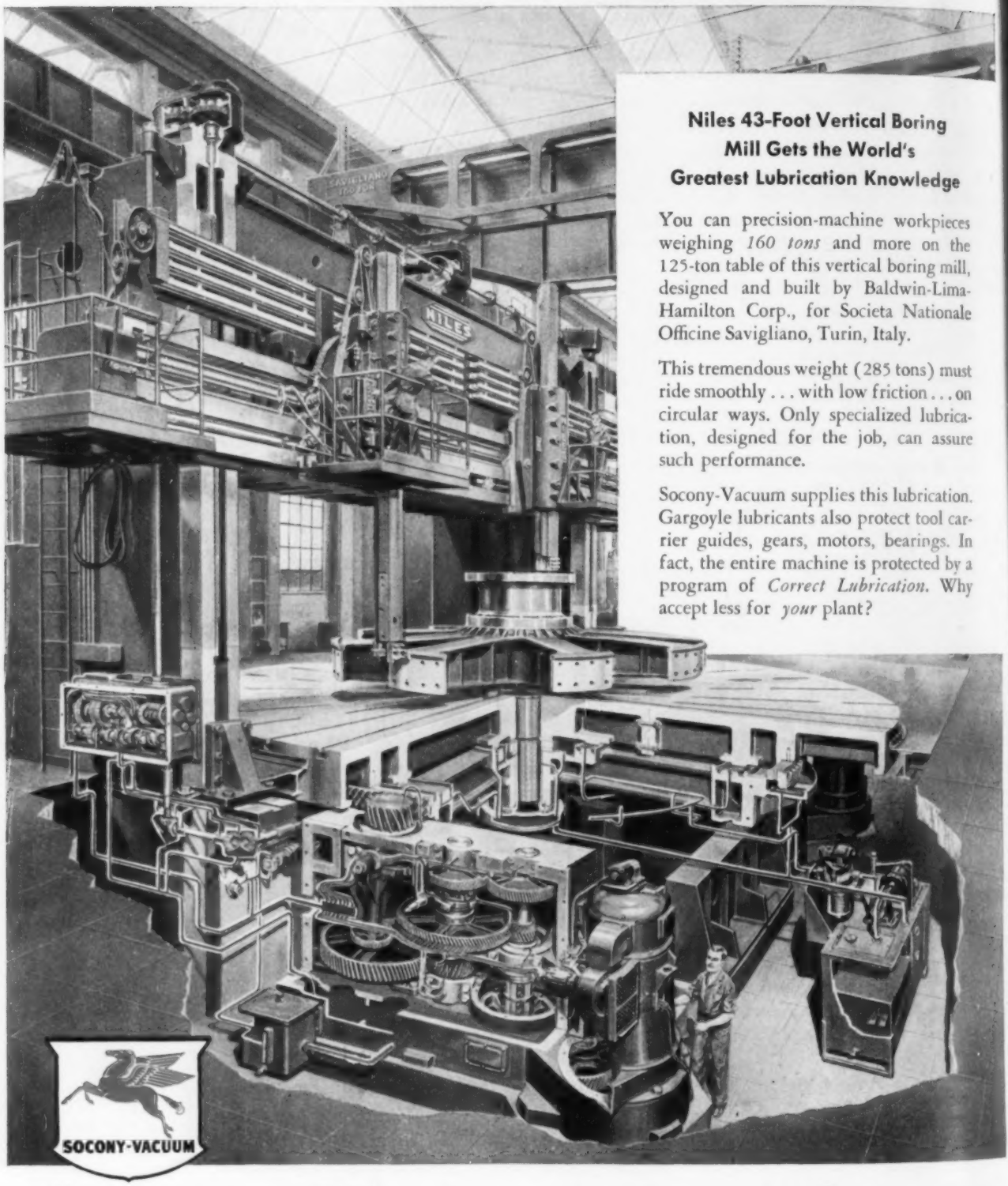
MSA Grants Otis Guaranty

Mutual Security Agency has issued a guaranty of currency convertibility to Otis Elevator Co. covering $112,000 investment in an elevator manufacturing firm in Italy.

Interest has been bought by Otis in an Italian firm, to be known as Stigler-Otis, S.A.I., rather than to rebuild an Otis-owned plant at Naples which was destroyed during the war.

TO WORK ON PROBLEMS blocking the way to a united Europe, President Eisenhower last week met with representatives of the European Coal, Steel Community. At the conference were: (Front row, l to r) Jean Monnet, president of the organization; President Eisenhower; Franz Etzel, Germany. Standing: Secretary of State Dulles; Dirk Spierenburg, Netherlands; David Bruce, U. S. representative; MSA Deputy Director Rand.

"Operating Table"
FOR 160-TON GIANTS!



Niles 43-Foot Vertical Boring Mill Gets the World's Greatest Lubrication Knowledge

You can precision-machine workpieces weighing *160 tons* and more on the 125-ton table of this vertical boring mill, designed and built by Baldwin-Lima-Hamilton Corp., for Societa Nationale Officine Savigliano, Turin, Italy.

This tremendous weight (285 tons) must ride smoothly . . . with low friction . . . on circular ways. Only specialized lubrication, designed for the job, can assure such performance.

Socony-Vacuum supplies this lubrication. Gargoyle lubricants also protect tool carrier guides, gears, motors, bearings. In fact, the entire machine is protected by a program of *Correct Lubrication*. Why accept less for *your* plant?

Socony-Vacuum *Correct Lubrication*

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

New Furnace Boosts Pig Capacity

Dedication of third Kaiser blast furnace brings West's capacity to almost 3 million tons . . . Was under 500,000 in '42 . . . U. S. Steel still leads in area—By *T. M. Rohan.*

Far western blast furnace capacity—less than 500,000 annual tons in 1942—jumped to within a shade of 3 million last week.

Big gain came with dedication of Kaiser's third 1200-ton blast furnace at Fontana, Calif., bringing rated capacity to 1.3 million tons. Far West capacity is now 2,996,000 tons with U. S. Steel ahead of Kaiser by only 368,000 tons. Colorado Fuel & Iron Corp.'s Pueblo Works now holds third place statistically, but its 960,000-ton capacity is not a major factor in the area's pig output.

Use Less Coke . . . The new Kaiser unit, a major step in a current $65 million expansion, is basically identical to the two installed earlier. Record low 1952 coke consumption of 1409 lb of coke per net ton of iron produced is claimed for each of these compared to 1600 to 1700 lb national average. This, of course, cuts cost on the coal haul from Utah.

One innovation made on the No. 3 furnace by Kaiser Engineers is a 5 in. decrease in big bell diameter for a better burden stock line. Pyrometric cone 23, hardest commercially available refractory brick, is also used.

Longer-Lasting Brick . . . Although more difficult to cut and fit, it is expected to last considerably longer, and has been successfully used in the East. A cone 14 equivalent is used on the other two units. Area of the heating surface per stove is 184,000 sq ft.

Ore and coke storage bins are of structural steel rather than the original wartime concrete and a double hopper scale car is used. A new conveyor belt layout facilitates stock bin filling from two directions.

The three furnaces will be run at slightly less than capacity for the present, due to temporary low pig iron demand in the West. Annual seven-western-state market is about 200,000 tons.

Charge More Hot Metal . . . Rated Kaiser production is now about 120,000 tons, 100,000 of which is used in the openhearths. Balance is available for sale in the outside market. But Kaiser plans to boost use of hot metal in the openhearth charge to about 70 pct.

Increased supply of pig will be used for eventual openhearth expansion. For the present, however, it will probably further depress the already deflated southern California scrap market.

In dedicating the blast furnace to the plant workers, 3000 of whom attended, Pres. Henry J. Kaiser said Kaiser Engineers now has total employment of over 11,528, Kaiser Steel, 8279 and the parent Kaiser firm over 80,000 nationally.

First Mollerizing . . . The first mollerizing and anodizing job shop in the U. S. is getting off to a humble start in Redwood City, Calif. Light Metal Processors, Inc., has obtained the first job shop license for the 12-year-old Swedish process invented by G. A. Moller from American Mollerizing Co. of Beverly Hills, Calif.

Ground breaking is this week. The $250,000 plant is expected to start production in September and employ about 125 after volume is reached.

FIRST OF EIGHT steel retaining gates for the Folsom Dam at Roseville, Calif.

Under Test . . . The mollerizing process has been under exhaustive tests in the U. S. by metal firms, utilities and the Navy since its introduction here about 2 years ago. Some success is reported on mollerizing titanium sheets for better drawing qualities.

Principal western markets are expected in industrial type window sash, pole line hardware, transmission towers, heat treating equipment such as carburifying pots, marine, aircraft and inland cooling towers.

Form Defense Pool . . . Los Angeles metalworking firms are getting together on defense orders. Last week 30 met with Small Defense Plants Administration officials to pool production facilities for more and better handled orders.

Known as United Western Manufacturers, Inc., the pool is the first western metals group of six in the country. Up to $50 million business is expected in the first year with operations beginning in the next 5 weeks.

Springs Expand . . . Coil spring manufacture, especially for airplanes, is on the rise in Los Angeles. Latest expansion is Seaboard Coil Spring Div. of Associated Spring Corp. of Bristol, Conn., which is completing a $750,000 plant. Formerly a separate firm, Seaboard last year became a division of Associated, which makes everything from watch springs to bridge anchor springs.

Return to Pay-As-You-Go Purchasing

Defense cutbacks, stiffening civilian competition will increase instalment buying . . . Permits firms to keep cash reserves . . . Gear sales mounting—By *E. C. Beaudet.*

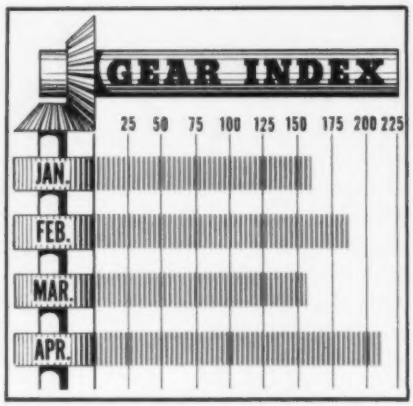
A substantial increase in the volume of installment selling by machine tool builders and distributors during the next 12 months is forecast by financial houses.

These firms believe present and anticipated cutbacks in defense requirements for machine tools will result in a return of civilian marketing methods.

Much of the installment buying is expected to come from medium and small-sized manufacturers. Increasing civilian competition throughout industry together with a slackening of defense orders make prospects of more "pay-as-you-go" selling look bright.

More Competition . . . Lower output producers realize they cannot rely on defense orders to maintain their sales volume. On the other hand, civilian output, while continuing at high levels, is experiencing stiffer competition.

To keep pace competitively, manufacturers must bring their productive equipment up to date. In view of market uncertainties and unsettled world conditions they will tend to favor installment purchases rather than deplete their cash reserves.



Orders received by independent gear manufacturers as reported to American Gear Manufacturers Assn., expressed as percentage of base. 1947-1949=100 pct.

Savings achieved by the increased productivity of new equipment could be used to meet time payment obligations while business is still strong. Cash reserves could be kept intact to meet market emergencies if they should arise.

Need Cash Reserves . . . Maintaining a safe cash reserve is important to both large and small manufacturers. Excess profits taxes and unrealistic depreciation policies have strapped the funds of many major concerns and has caused them to tread warily in making capital expenditures.

The tightening money market plays no small part in financing plans of both large and small manufacturers. Bank loans are harder to get as, according to Robert H. Craft, vice-president and treasurer, Guaranty Trust Co. of New York, the aim of present credit policies has made the banking system more selective.

Gear Sales Up . . . Sales by gear manufacturers are moving at a fast pace as volume during April increased 36.8 pct over March. Despite slackening defense orders throughout industry, gear manufacturers for the first 4 months of the year are ahead of last year.

The American Gear Manufacturers Assn. index shows the average volume from January through April 1953 at 178.9, as compared with 145.6 during the July-December 1952 period.

Set Record . . . Under these happy circumstances a record-breaking attendance of 340 members and associate members was attained at the AGMA's 37th Annual Meeting at Hot Springs, Va. last week. With business proceeding at a satisfactory pace, one of the gear makers' prime concerns is that they receive proper recognition of their importance in industry by the Office of Defense Mobilization.

New American Gear Manufacturers Assn. Officers

G. H. Sanborn
President

R. B. Holmes
Vice President

F. R. Eberhardt
Treasurer

T. A. Jones
Executive Committee

R. B. Tripp
Executive Committee

E. C. Denne
Executive Committee

R. E. Smallwood
Executive Committee

Single spindle 1800 Series Frauenthal Grinder, specially engineered for grinding Diesel engine connecting rods . . . typical of numerous operations where the workpiece is large and cumbersome but hole to be ground is relatively small.

. . . another "MILLIONTHS-of-an-inch" Frauenthal Grinder

IT'S the extreme precision to which Frauenthal Grinders work that surprises metalworking leaders who know the potentials of modern speed-and-precision machines. You will be surprised, too, at the savings in time and money you can make with these super-precision grinders!

In both toolroom and production set-ups, simultaneous grinding of inside or outside and faces . . . or boring and turning . . . can now be held to such close precision of parallelism and concentricity that measurements of tolerance get down to *fractions-of-ten-thousandths,* best expressed in *millionths* of an inch!

Manufacturers of precision parts for aircraft, jet and automotive engines, tanks, gunmounts, radar units, Diesel connecting rods, plug valves, high precision bearings and other industrial and military parts and assemblies find Frauenthal Grinders profitable investments. You are sure of utmost precision, unfailing interchangeability and speedy, dependable production with these "millionths-of-an-inch" grinders.

Series 1800 available in 4 standard sizes, with 30", 36", 42", or 48" tables and 60" maximum swing. Specially engineered features can be included to fit your requirements.

Frauenthal
MULTIPLE-HEAD SUPER-PRECISION CYLINDRICAL **Grinders**
PRECISION-GRIND INSIDE, OUTSIDE AND FACES SIMULTANEOUSLY TO MILLIONTHS OF AN INCH!

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FARM EQUIPMENT

THE CORRECT FASTENER FOR THE JOB!

Precision and Quality Workmanship, backed up by 38 years of Erie experience, are yours for thoughtful buying. Whether you require a fastener made from carbon, alloy or stainless steels, to special design, to exacting specifications, Erie fasteners will save you time and expense . . . from your planning, to procurement, to fabrication. Submit your fastener requirements to us, Erie Service will meet the challenge.

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ALLOYS • STAINLESS
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——Free Publications——

Continued

Core curing

The way dielectric heat is able to overcome some of the disadvantages of conventional core baking methods is discussed in a reprinted article available from Allis-Chalmers. The article, which appeared in a previous issue of the company's *Electrical Review*, tells of the development of the dual heat core dryer, and discusses the preparation and curing of cores and core assembly and casting. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 14 on postcard, p. 87.

Coal car unloaders

Fairfield coal car unloaders are said to eliminate shovelling from the far side of car hoppers, to reduce the time required to unload directly into trucks, and to increase real capacity and storage radius of conveyors. Four different models of car unloaders are covered in a new bulletin. *Fairfield Engineering Co.*

For free copy circle No. 15 on postcard, p. 87.

Casters, trailers

Swinging Hub Caster was designed as a shock absorbing caster that would permit smoother materials handling and remain completely practical, efficient and economical. Construction and advantages of these casters are presented in a new folder. There is also data on Standard Mfg. Co.'s multi-use trailers. *Standard Mfg. Co.*

For free copy circle No. 16 on postcard, p. 87.

Storage aids

It is claimed that in many instances Farley storage aids have increased plant storage capacity as much as 50 pct at one-third to one-quarter the cost of new construction. Details are in a new brochure. A blank is included for firms interested in receiving estimates on Farley installations without obligation. *Arthur C. Farley & Co.*

For free copy circle No. 17 on postcard, p. 87.

26 types and 5,850 sizes —as near as your telephone

EVERY so often, a machinery maker comes to the Timken Company for help with a very special bearing application. Something, he's pretty sure, we've never encountered before.

Almost always, we're able to give him a pleasant surprise. In over 50 years of helping manufacturers with special bearing problems, all the while improving our designs, we've produced an astonishing variety of tapered roller bearings. So many sizes and shapes that the "new" bearing has usually already been designed and made by the Timken Company. So many that the "new" design problem has usually been already solved with the help of Timken Company engineers.

If the people who buy the machines ever have occasion to replace a Timken® bearing, they get the same kind of pleasant surprise. Even when a machine's very old, they can almost always get immediate delivery on Timken bearings for replacement.

Be sure that every bearing you use in the machines you buy or build is stamped with the trademark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

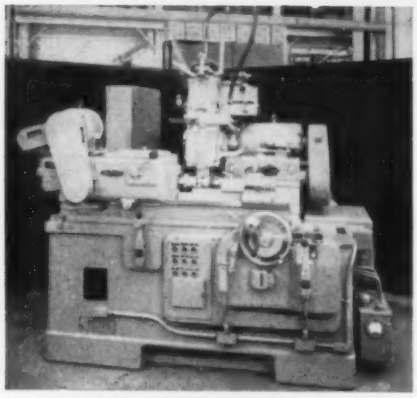
TIMKEN TAPERED ROLLER BEARINGS

TRADE-MARK REG. U.S. PAT. OFF.

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂ THE TIMKEN TAPERED ROLLER ⊂ BEARING TAKES RADIAL ⊂ AND THRUST → LOADS OR ANY COMBINATION

NEW EQUIPMENT

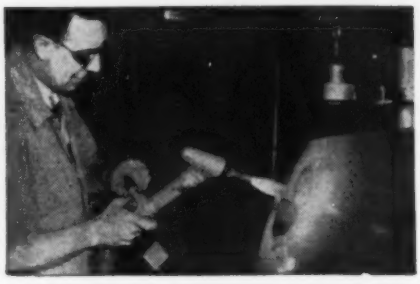
New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 87 or 88.



Complete packaged unit for piston grinding

Because of its fast, accurate action, this new 6x8-in. semiautomatic piston grinding machine is said to effect real economy in grinding elliptical automotive and aircraft type pistons to fine limits of size and finish. The machine can be arranged for grinding complex skirts where the degree of relief varies from the top to the bottom of the skirt. It is a heavily built plunge grinder with a time tested wheel spindle unit and a proved cam generating mechanism of extreme endurance. Fast, precise action obtained from the hydraulically actuated revolving feed screw wheel feed mechanism contribute to high productivity. Running the machine takes little operating effort. *Norton Co.*

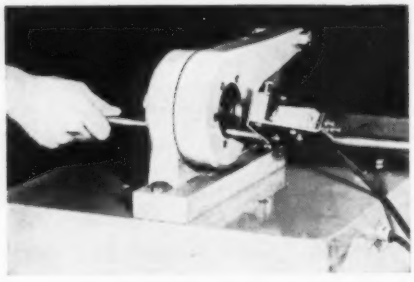
For more data circle No. 18 on postcard, p. 87.



Flame-spray gun applies porcelain to steel plate

A new portable flame-spray handgun applies porcelain to steel plate, a process which will open the way for permanent protection against corrosion of steel structures too large physically for factory treatment. The gun shoots porcelain material through a high temperature acetylene flame and fuses it to steel. The materials necessary for the flame-spray operation are channeled to the gun by four rubber feed lines, each of which is regulated by a knob at the handle. *Seaporcel Metals, Inc.*

For more data circle No. 19 on postcard, p. 87.



Gage speeds cutting of bar stock

New Micro-matic gage makes it possible to maintain in excess of 9000 cuts per hr in bar stock with the Di-Acro power rod parter. The operator sets the gage for the desired length of cut, inserts material in proper hole in the cutting heads (ten hole sizes accommodate stock from 1/16 to 5/8 in. diam) and pushes the material through the heads flush against the gage. The contact is relayed to a solenoid which trips off the cutting action and allows the cut part to be ejected. *O'Neil Irwin Mfg. Co.*

For more data circle No. 20 on postcard, p. 87.

Conveyors eliminate manual handling of flasks

A roller conveyor system has been engineered for mechanically handling flasks at the Waterbury Mfg. Co. When a mold is made it is conveyed to pouring location on one of two roller conveyors which flank each of eight molding stations. When the conveyor line is full, molds are poured off by the pourer. After cooling, molds are pushed back along the conveyor to shakeout station where a helper performs the shakeout operation, allowing the molder to devote full time to preparing molds. Belt conveyor takes sand and sand bin for reuse. Overhead monorail conveyor carries gates to the cleaning room. Virtually all manual handling is eliminated. Emptied flasks are stacked at the molding station ready for the next mold. *Gifford-Wood Co.*

For more data circle No. 21 on postcard, p. 87.

Turn Page

Acme Steel announces

revolutionary new advance in wire stitching

NEW ARCUATE WIRE STITCH
NEW
Acme Steel Arcuate Stitching forms flat wire into arc for greater strength.
OLD
Ordinary flat wire stitch has less holding strength than Arcuate Stitch of same wire size.
ORDINARY FLAT WIRE STITCH

In Acme Steel's new Arcuate stitching method, flat stitching wire is formed into an arc, increasing its column strength, making a smoother stitch with lighter wire, delivering up to 42% more stitches per pound of wire. Faster, too!

New Acme Steel Arcuate Stitching cuts wire costs 24 per cent

HERE'S HOW IT WORKS: Wire stitching has long been favored for assembling and closing of cartons of all types. Now "Stitching Headquarters"—Acme Steel Company—announces a new stitching method: Arcuate Wire Stitching.

In Acme Steel's new Arcuate Stitching method, regular flat stitching wire is formed into an arc by the stitching machine, making a stronger stitch so you can use lighter gauge wire for boxmakers' joints or any other stitching jobs. Increased column strength makes each stitch easier to drive. Stitches drive straighter, clinch better, hold tight.

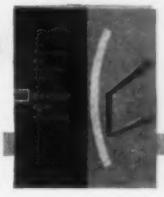
RESULT: You save 24% in wire costs. You get 42% more stitches from each coil of wire (using .103 x .014-inch instead of .103 x .020-inch wire, for example). Arcuate Stitching virtually eliminates machine jamming—reduces down time and produces perfect stitches more consistently. This means that you can stitch more cartons per day, and get a better-looking carton every time.

It's easy to adapt your present equipment. There are conversion parts-kits for most popular model stitching machines.

CALL your Acme Steel representative for all information. Or, for a free folder giving complete details and a stitched sample, write to Acme Steel Products Division, Dept. IA-63, Acme Steel Company, 2840 Archer Ave., Chicago 8, Illinois.

FREE →

Get the details . . . send in the coupon for a free folder on Acme Steel's new Arcuate Stitching.



ACME STEEL CO., Dept. IA-63
2840 Archer Ave., Chicago 8, Illinois

Please send me free copy of your new folder on Arcuate Wire Stitching and a stitched sample.

*Name*_____

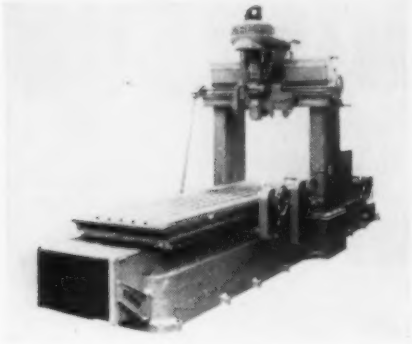
*Company*_____

*Street Address*_____

*City*_____ *Zone*____ *State*_____

ACME STEEL

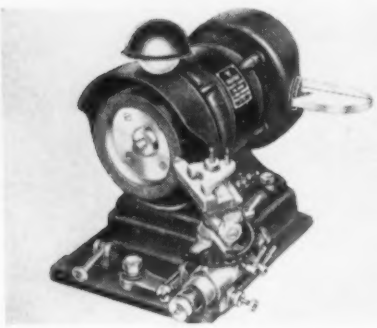
STITCH IT . . . STRAP IT . . . SHIP IT . . . SAFELY!



Profiler can be operated by unskilled labor

An additional model of the Aeroframe profiler and milling machine is especially suitable for handling large forgings and castings, such as aluminum and magnesium air frames and cast iron parts and steel forgings. The machine has a 10-ft table with full support bed; combines rigidity of construction with ability to take full advantage of tungsten carbide tools. A two-speed 15 hp motor operating through back geared drive provides a spindle speed range of 125 to 4600 rpm. Improvements include cross head mounted on vibration dampened cross rail and heavier bridge column. Machine can be fitted with hydraulic following attachment. *Morey Machinery Co., Inc.*

For more data circle No. 22 on postcard, p. 87.



Precision grinder available at moderate price

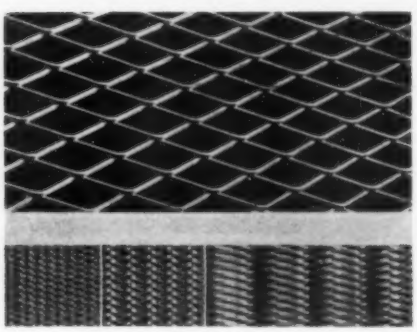
New precision grinder enables the average plant to do its own precision grinding at low cost. The machine is claimed to produce perfect keen cutting edges and exact angles on all types of modern cutting tools, such as carbide, Stellite, and high speed steel. The tool is rocked back and forth across the entire wheel face, eliminating scoring and grooving of the wheels, and greatly increasing their life. All front side and top angles can be set precisely, in vertical and horizontal planes. Reportedly unskilled operators can produce fine work on the machine. *Thomas Prosser & Son.*

For more data circle No. 23 on postcard, p. 87.

Electrode holder has long productive life

New, cooler and lighter electrode holder for arc welding has less tendency to roll in the operator's hand because the design places the jaw lever close to the handle; a squeeze of the hand releases the electrode stub. A fully-enclosed spring and spring adjustment insures longer production duty. Reversible jaw insulators can be reconditioned on the line, eliminating costly downtime. The holder is exceptionally light for the work it performs because of its channel construction and its compound cam and lever action for parallel opening of the jaws. It is available in 200, 300 and 500 amp sizes. *A. O. Smith Corp.*

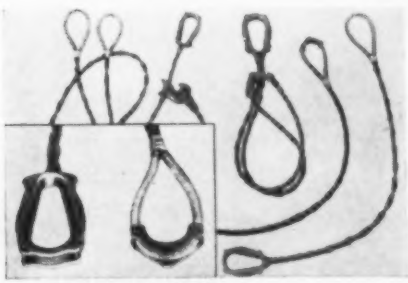
For more data circle No. 24 on postcard, p. 87.



Expanded aluminum mesh made in colors

Expamet expanded aluminum is manufactured in England by a special process and has general, industrial and decorative applications. The material is made in brilliant metallic and opalescent colors and characterized by diamond-shaped and other special meshes. It is lightweight, will not rust, can be dyed and anodized in colors which will not peel, chip or flake and will withstand corrosive attack by most acids. Un-anodized mesh is available for plants that have anodizing facilities. *British Industries, Inc.*

For more data circle No. 25 on postcard, p. 87.



Braided slings feature pin-lock fittings

An 8-part braided sling features a new type of reusable thimble fitting that is said to effect savings of 20 pct or more. Pin-lock thimbles are attached by pins instead of hammered-down clamps, and are readily removable for reuse. The Red-Strand 8-part braided sling itself is a new product. Tests were made in one large plant where the sling was subjected to 20 pct overabuse and showed no evidence of undue wear. *A. Leschen & Sons Rope Co.*

For more data circle No. 26 on postcard, p. 87.

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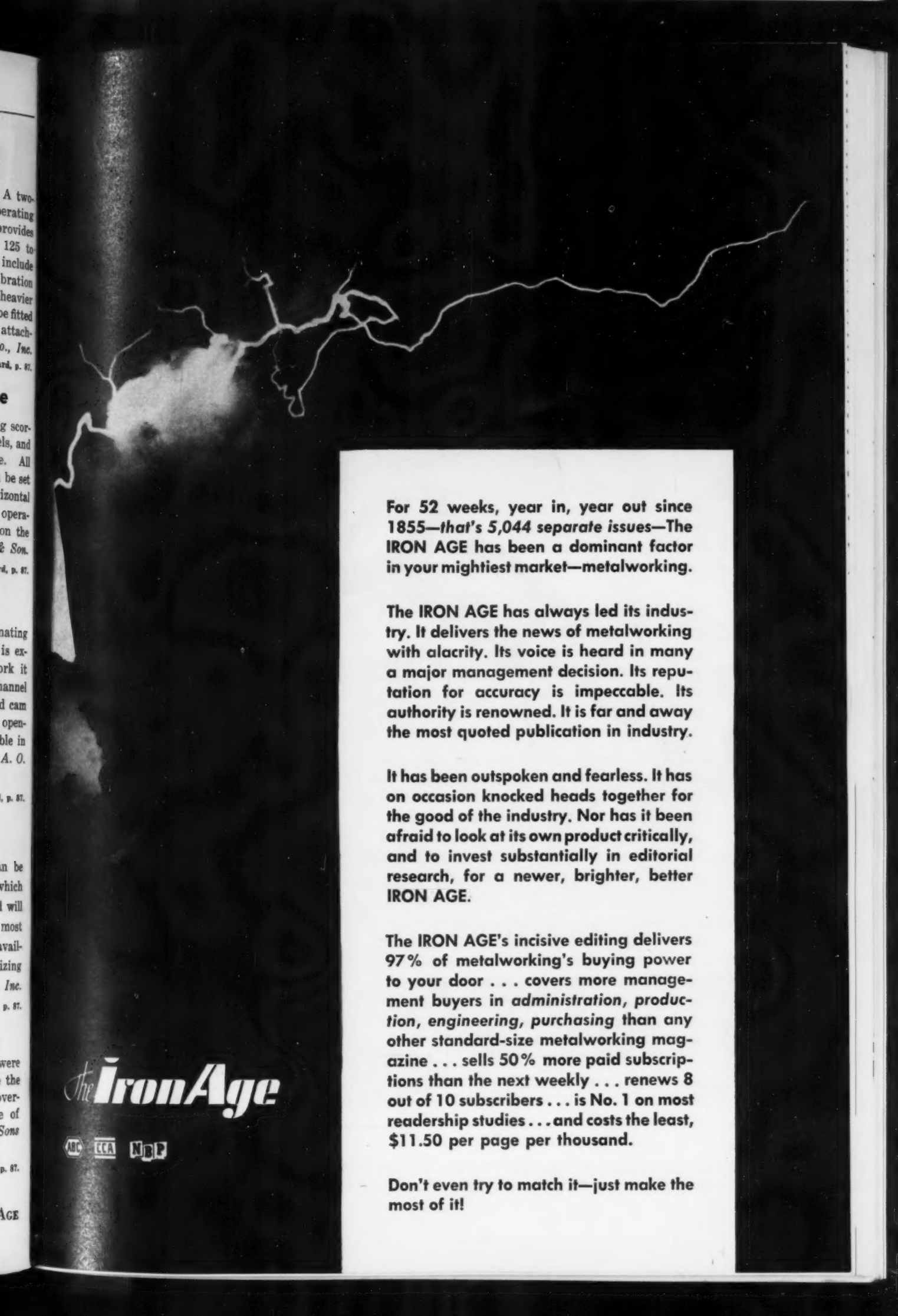

For 52 weeks, year in, year out since 1855—*that's 5,044 separate issues*—The IRON AGE has been a dominant factor in your mightiest market—metalworking.

The IRON AGE has always led its industry. It delivers the news of metalworking with alacrity. Its voice is heard in many a major management decision. Its reputation for accuracy is impeccable. Its authority is renowned. It is far and away the most quoted publication in industry.

It has been outspoken and fearless. It has on occasion knocked heads together for the good of the industry. Nor has it been afraid to look at its own product critically, and to invest substantially in editorial research, for a newer, brighter, better IRON AGE.

The IRON AGE's incisive editing delivers 97% of metalworking's buying power to your door . . . covers more management buyers in *administration, production, engineering, purchasing* than any other standard-size metalworking magazine . . . sells 50% more paid subscriptions than the next weekly . . . renews 8 out of 10 subscribers . . . is No. 1 on most readership studies . . . and costs the least, $11.50 per page per thousand.

Don't even try to match it—just make the most of it!

The IronAge

ABC ECA NBP

KELLER Air Tools

for heavy production grinding

ANOTHER EXAMPLE OF
KELLER *Air Tools*
engineered to industry

Direct drive air motor

Light weight and balance

Low air consumption

Less fatiguing to operator

FACTS IN BRIEF
ABOUT KELLER PNEUMATIC GRINDERS

Keller Pneumatic Grinders combine great power with light weight . . . simplify the work of snagging castings, removing fins, dressing and polishing. Their spindles are specially hardened to reduce wear on the double-row bearings.

Keller Grinders have earned an enviable reputation for smooth operation through years of service. Governor maintains a constant speed that saves wear on grinding wheels.

Keller also makes die grinders and vertical grinders

Send for
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Please send me a free copy of your booklet on Pneumatic Grinding and Cutting Tools

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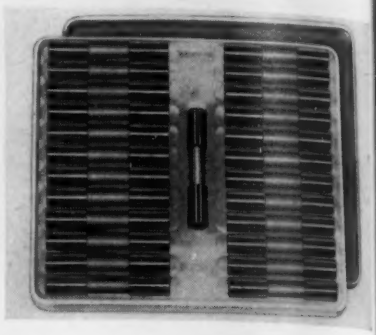
—New Equipment—

Continued



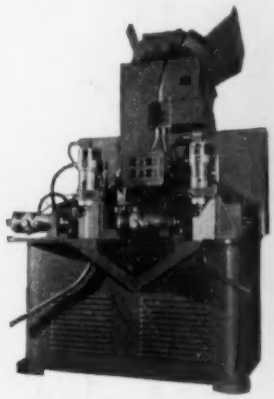
Plug gage set

New system of precision gaging consists of a 25-gage set: one gage of nominal size, 12 gages increasingly larger in 0.0001 increments; 12 gages increasingly smaller in 0.0001 increments. Gages are used as both work gages and inspection gages. Each set is available in any nominal size from ⅛ to 1 in., in increments of 1/64's. *Deltronic Corp.*

For more data circle No. 27 on postcard, p. 87.

Drilling and deburring

New automatic, hopper-feed drilling and de-burring machine is designed principally for second operations on screw machine parts up to 1 in. diam and 2 in. long, drilling holes at any angle desired. It operates automatically. The only attention required is to keep the hopper filled. Production capacity is 3000 pieces per hr. Its double-feed feature has a dual purpose: larger production at a slower operating speed is possible and one half of the machine can be serviced while the other half is in operation. *Inter-Lakes Engineering Co.*



For more data circle No. 28 on postcard, p. 87.

Turn Page

puzzled about handling costs?

then consult **BROWNHOIST**

Railroads, steel mills, mines, docks and large manufacturing plants can cut costs and speed materials handling with BROWNHOIST equipment. BROWNHOIST builds boat unloaders, fast plants, traveling bridge cranes, storage bridges, shipyard cranes, car dumpers, locomotive cranes and related machinery to handle bulk materials in large quantities rapidly and efficiently. The traveling ore bridge shown here, for example, can unload and stockpile approximately 600 tons of iron ore per hour.

BROWNHOIST equipment is built in capacities to meet virtually every bulk materials handling requirement. If you want to save production time and money, it will pay you to consult your nearest BROWNHOIST representative or write us today for complete information.

This Traveling Ore Bridge helped one large manufacturer cut the cost of unloading shipments of ore from Great Lakes' vessels. It has a span of 234 ft., a raisable apron extending 88 ft. from the center of the pier leg and a fixed cantilever 55 ft. on the shear end. It is equipped with Brown patent ore buckets.

170

BROWNHOIST
builds better cranes

CLAMSHELL BUCKET

250 TON WRECKING CRANE

COAL-ORE BRIDGE

CAR DUMPER

INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, San Francisco, Chicago; Montreal, Quebec • AGENCIES: Detroit, Birmingham, Houston, Los Angeles.

PITTSBURGH GEAR *Process*

Guarantees Longer Life

Only PITTSBURGH **Armored Gears** are made according to the exclusive PITTSBURGH formula which covers a proven combination of metal, machining, AND heat-treating. It is not enough to use tool steel, which often will not stand shock loads. PITTSBURGH selects the best metal for the particular gear body, then machines it, and heat-treats the wearing surfaces to give ultimate life.

This process gives you gears that have tough, ductile cores, and teeth that wear almost interminably. PITTSBURGH **Armored Gears** are guaranteed to give five times the life of untreated gears, one to one and one-half times the life of oil-treated gears, and equal or longer life than any other gear in identical service. You can identify them by their **"Pittsburgh Purple"** corrosion preventive coating.

You'll never know how good PITTSBURGH **Armored Gears** are until you try them. Send us your specifications or give us details of service requirements so that we can make recommendations.

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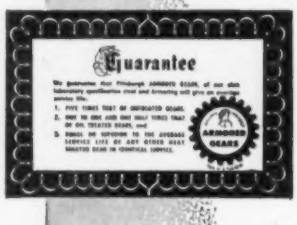
REDUCERS
CRANE WHEELS



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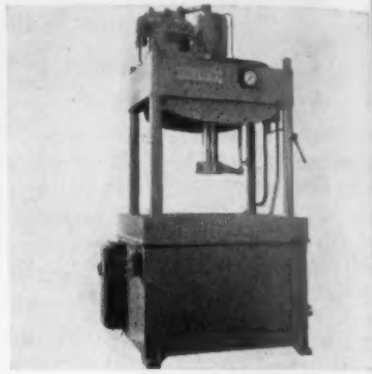
Pittsburgh 22, Pa.
Phone: ATlantic 1-9950

subsidiary of BRAD FOOTE GEAR WORKS, INC. • CICERO 50, ILLINOIS

Four-post hydraulics

Two four-post hydraulics are heavy rugged presses of 50 and 75 tons, cast of hydraulic semi-steel and hard Meehanite metal respectively. Cylinder is a separate unit equipped with piston and piston rings. The 5-in. diam hardened and ground ram has removable ram nose. Ram

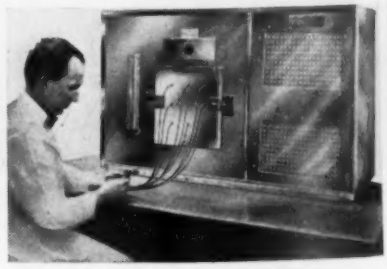


stroke is adjustable to 12 in. Rapid traverse operates at 1000 psi. The work speed is higher pressure by boosters, giving higher tonnage with low H.P. input. Clearance between tierods is 36 in. l to r; f to b 25 in. Machined work surface of the table is 36 in. square. A direct reading gage registers tonnage applied. *Greenerd Arbor Press Co.*

For more data circle No. 29 on postcard, p. 87.

Testing unit

Low temperature bench type test chamber is capable of extreme temperature ranges within a relatively short time. Temperature range on the standard unit is from −80°F to

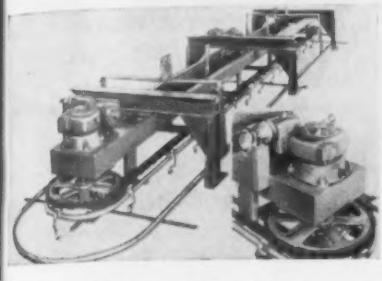


+185°F, with the pull-down to −80°F taking 30 min or less. Test chamber measures 12x12x12 in. Unit is compact and has simplified controls. Cabinet is stainless steel. *Webber Mfg. Co., Inc.*

For more data circle No. 30 on postcard, p. 87.

Plating equipment

New packaged semi-automatic plating system has been designed to replace or augment still tank plating for the electroplating field. Increased production of 100 pct is reported. The system may be altered for different jobs by shifting the pusher shoes to the desired

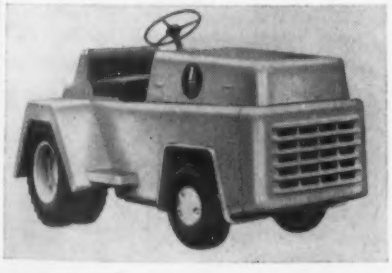


spacing. Maintenance costs are reduced as all wear parts are Zerk lubricated, roller chain is standard, and the Micarta pusher shoes last indefinitely. Variable speed control and drive are combined in one unit. Efficient agitation is obtained by longitudinal motion. Design permits loading at any point. *Wagner Bros., Inc.*

For more data circle No. 31 on postcard, p. 87.

Maneuverable tractor

This pneumatic tired tractor has a drawbar pull of 6000 lb; is compact, being less than 5 ft high x 10 ft long, with outside turning radius of 10 ft 1 in. Torque-converter drive coupled to a full reversing two-range transmission



provides forward speed range from 1.6 to 16.9 mph and a reverse speed from 1.8 to 10.0 mph. Additional features are 6-cylinder 67 hp gasoline engine, low center of gravity, smooth torque converter pull at all stages of travel, no clutch maintenance, and fullest operator visibility. *Frank G. Hough Co.*

For more data circle No. 32 on postcard, p. 87.

Turn Page

HOW TO SOLVE HOT SPOTS

(UP TO 2200° F)

in products and processes

If improvement of your product or process depends upon use of extremely high temperature, while minimizing its destructive effects, use Kentanium at the critical points.

WHAT is Kentanium?

Chiefly titanium carbide (and small percentages of other refractory metal carbides), with nickel "binder". Uses neither tungsten nor cobalt. Hardness: Up to 93 RA. Weight: ⅔ that of steel.

WHAT can it do?

Resist thermal shock, withstand oxidation and abrasion, retain great strength at high temperatures (1800°F and above).

WHERE is it in use?

Successful applications include: Valves, valve seats, reduction crucibles, anvils for spot welding, hot extrusion die inserts, bushings, thermocouple protection tubes, flame tubes, furnace tong tips, balls for hot hardness testing, nozzle vanes and blades for jet engines, and many others.

WHAT forms are made?

Tubes, rods, bars, flats by extrusion process. More complex parts by machining from pressed slugs before sintering; extremely accurate parts by grinding to required tolerance after furnace sintering.

HOW can you use it?

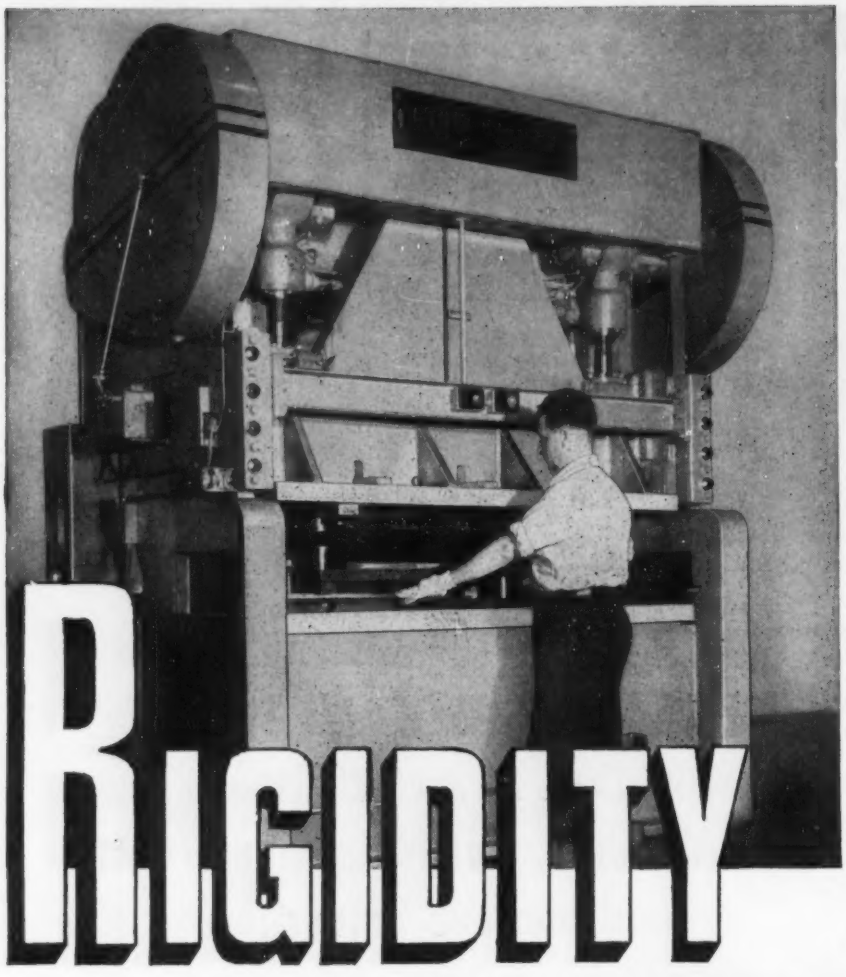
This remarkable new metal, available in many "grades" to meet specific combinations of imposed conditions, can best be adapted to your high temperature problem by cooperative effort. Our engineers will be glad to discuss how you can get best results from Kentanium.

An Exclusive Development of KENNAMETAL® Inc., Latrobe, Pa.

KENTANIUM

HEAT-RESISTANT, HIGH-STRENGTH, LIGHTWEIGHT CEMENTED TITANIUM CARBIDE

See KENTANIUM demonstration—Basic Materials Show, N. Y.—SPACE 59C



RIGIDITY

AND WIDE BED AREA MAKE THE BATH PRESS TYPE BRAKE IDEAL FOR BLANKING... PIERCING... SHALLOW DRAW

THE RIGIDITY of the Bath Press Type Brake is evidence of its high standard of construction. With speeds of 45 or 60 strokes per minute, it has many outstanding advantages such as Overload Protection, Pneumatic Clutch-Brake, End Feeding, Serial Operation etc. The one piece welded frame, with closed side housings, makes for perfect die alignment, which means stamping, bending etc. to very close measurements. Slide areas are large, about four times those in ordinary bending presses, adequate for most of the difficult blanking, stamping and punching operations. Ram and bed working areas are flush with the forward housing and easily reached by the operator.

Under a heavy production schedule the efficient and economical operation of the Bath Press Type Brake increases production and offsets losses incurred elsewhere.

For further information and specifications on the Bath Press Type Brakes write for this catalog.

THE CYRIL BATH COMPANY

MANUFACTURERS of METAL FORMING MACHINERY

6940 MACHINERY AVE. • CLEVELAND 3, OHIO

Ball screwjack

Vard ball screwjack assemblies are available in a wide range of sizes to meet any problem which calls for transmission of rotary motion to linear motion. The extra high efficiency curve is achieved through freely circulating ball bearing arrangement. Standard sizes from 3/8 to 4 in. diam and up to 22 ft long are being furnished. *Vard, Inc.*

For more data circle No. 36 on postcard, p. 87.

Granite layout plates

Black granite layout plates, differing from surface plates, do not have clamping edges, but are straight-sided. By eliminating sawing of edges for clamping purposes, and allowing more tolerance, the manuacturer is able to produce the plates at a lower cost. Surfaces of the layout models are finished to an accuracy up to 0.0002 ipf. Black granite plates have no glare, require no oiling and cannot corrode. *Collins Microflat Co.*

For more data circle No. 37 on postcard, p. 87.

The Iron Age

SALUTES

D. L. Petty

Thirty-one years' construction experience on all the big jobs makes him a top iron work boss.

THEY probably call him "Beechnut" because of his habit of tobacco conservation—when the inevitable cigar is reduced to a charry stub he trims the ash and chews the unburned part.

But don't let that trademark fool you. Behind the Groucho Marxian grin, ready wit, and amiable disposition is a storehouse grown rich with construction knowledge. Beech is in great demand as a construction superintendent. Iron work is his specialty.

During his 31 years of gaining construction experience (he's only 47) he's worked on most of the big ones: George Washington Bridge, San Francisco Bay Bridge, Empire State Building, Golden Gate Bridge, Radio City, to name a few. Along with these monuments of progress he has helped to build stronger sinews for industry: Blast furnaces, coke ovens, heavy presses and atomic energy plants.

But for a miracle of luck the career of the F. H. McGraw & Co. superintendent might have ended abruptly. He slipped on an ice-coated girder in Detroit and fell 69 ft, landing on his head and chest.

What was his best steel erection record? "Setting up 450 tons of pre-filled bottles on an Air Force heavy extrusion press in 6 hr."

Cocky? Well, maybe. But if you put the question to Beech he will let you know he can set more blankety-blank iron than any other so-and-so in the business. He is currently superintendent of a coke oven job for American Steel & Wire Co. in Cleveland.

His hobbies are sports—all of them.

ASK BAIRD ABOUT IT!

HIGH PRODUCTION TOOLING

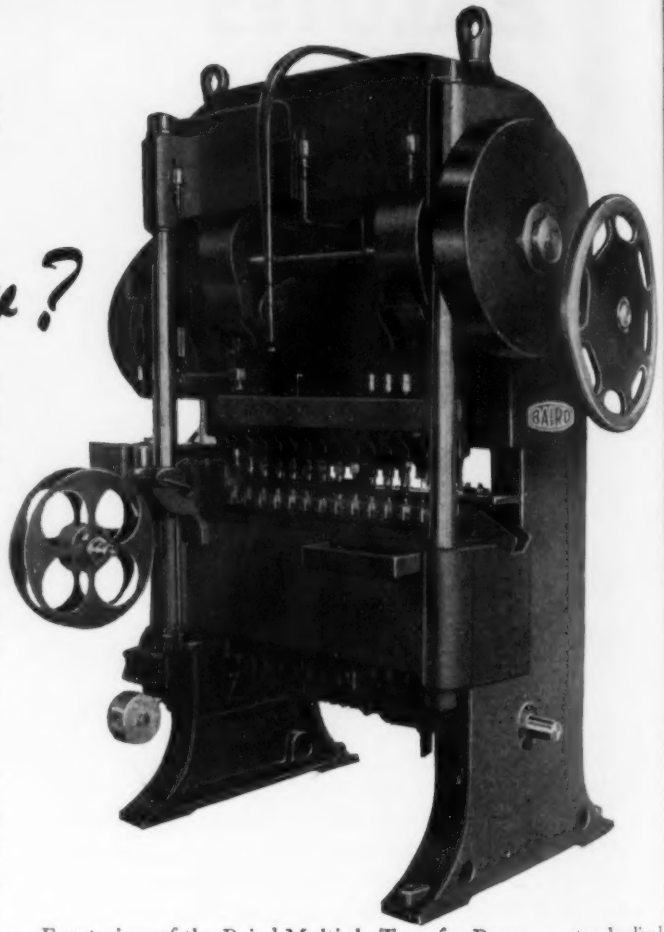
Biting off *More* than you can *Chew?*

Many types of small stamping machines can bite off coiled metal stock, but the BAIRD MULTIPLE TRANSFER PRESS cleverly chews each length into accurately formed products at the rate of thousands of pieces per hour.

Almost-human transfer fingers automatically grip and carry the work to progressive die stations where blanking, drawing, piercing, embossing, slitting, trimming, broaching, sizing, hexing, forming, etc., complete the piece.

Simply stated, the Transfer Press combines, in a single cycle, operations that otherwise might require several smaller machines with an operator for each. There are almost endless tooling possibilities . . . set-ups that turn out millions of small parts at extremely low cost.

An installation of Baird Multiple Transfer Presses puts the buyer in a most favorable competitive position in a buyer's market. Better "ask Baird about it!"



Front view of the Baird Multiple Transfer Press . . . standardized in 12 sizes with rated working pressures from 5 to 55 tons. Coiled stock from 2½" to 4" in width is automatically fed at high speeds.

SEND FOR TRANSFER PRESS BULLETIN

the BAIRD MACHINE COMPANY
STRATFORD • CONNECTICUT

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6BA53

The Iron Age

INTRODUCES

Carl P. Brockway, elected president and director, ASBESTOS MFG. CO., Huntington, Ind.

Thomas T. Kling, elected vice-president and director, THE LODGE & SHIPLEY CO., Cincinnati.

Carl J. Koelsch, elected vice-president, FRUEHAUF TRAILER CO.

Gordon M. Genge, becomes vice-president and sales manager, ASSOCIATED ENGINEERS, INC., Agawam, Mass.

William K. Meyers, elected executive vice-president, THE BASSICK CO., Bridgeport, Conn.

H. E. Fellows, elected vice-president, LESTER B. KNIGHT & ASSOCIATES, INC.

Paul C. Funkhouser, appointed vice-president in charge of Operations, HENNEY MOTOR CO., INC., Freeport, Ill.

Carl H. Morken, appointed vice-president in charge of manufacturing, KENNEDY VALVE MFG. CO., Elmira, N. Y.; and **Thomas S. Turkington**, controller, also becomes secretary.

Thomas Wolfe, president, elected chairman of the board, PACIFIC AIRMOTIVE CORP., Burbank, Calif., succeeding Arthur C. Stewart, who has resigned as chairman but will continue as a member of the board.

Lawrence R. O'Rourke, appointed a sales executive, PENNSYLVANIA INDUSTRIAL CHEMICAL CORP., Chester, Pa.

Glen R. Fitzgerald, appointed director, Process Development Section, GENERAL MOTORS CORP., Detroit.

Peter K. Baade, appointed test engineer, Environmental Test Chamber Div., TENNEY ENGINEERING, INC., Newark, N. J.

Charles M. Heath, appointed assistant to the director of industrial relations, Fontana Works, KAISER STEEL CORP.

Bernard W. Crandell, appointed director of publicity, GMC TRUCK & COACH DIV.

Richard Crabb, becomes works engineer, BETHLEHEM STEEL CO., Bethlehem, Pa., succeeding L. D. Draper, who is retiring.

Douglas S. Birgfeld, appointed sales engineer, Philadelphia district office, Electro Dynamic Div., GENERAL DYNAMICS CORP., Bayonne, N. J.

Michael M. Muson, becomes cutting tool sales engineer, PRATT & WHITNEY, Div. of Niles-Bement-Pond Co., West Hartford, Conn.; and **Howard A. Small**, named cutting tool and gage sales engineer.

M. J. Fey, promoted to executive engineer, NICHOLS WIRE & ALUMINUM CO., Davenport, Iowa.

William B. Crump, appointed sales engineer in charge of Detroit office, MAY-FRAN ENGINEERING, INC., Cleveland.

W. A. Herpich, appointed manager of manufacturing, THE GALION ALLSTEEL BODY CO., Galion, Ohio.

Howard W. James, appointed manager—Advertising and Sales Promotion, FLEXIBLE TUBING CORP., Guilford, Conn.

Elmer H. Shafer, appointed manager, Steel Warehouse Div., BUILDERS STRUCTURAL STEEL CORP., Cleveland.

Frank Thompson, promoted to North Texas Territory manager, CORY CORP., Chicago.

Lester N. Shannon, Jr., appointed district manager, Southern District, FIRTH STERLING, INC.

M. B. TERRY, appointed president, American Brakeblok Div., American Brake Shoe Co., New York.

HARDAGE L. ANDREWS, appointed president, Jones & Lamson Machine Co., Springfield, Vt.

GEORGE C. MILLER, appointed president, Bakelite Co., a division of Union Carbide & Carbon Corp.

Arthur L. Carvill, becomes manager of electric utility field sales, GENERAL ELECTRIC CO., Meter & Instrument Dept., Lynn, Mass.; **Bruce B. Gravitt,** becomes manager of meter and time-switch sales; **James A. Yunker,** named manager of instrument transformer sales; and **Ralph W. Drayer,** named manager of time switch sales.

Robert Cole, named manager of advertising and sales promotion, OLIN INDUSTRIES, INC., East Alton, Ill.

Robert J. Kay, appointed sales manager, Merchant Trade Products, NORTHWESTERN STEEL & WIRE CO., Sterling, Ill.

H. J. Macdonald, appointed general manager, Buffalo plant, HANNA FURNACE & GREAT LAKES STEEL CORPS.; and **Earl C. Evans,** promoted to general superintendent. Mr. Macdonald succeeds Charles Heist, who is retiring.

Howard S. Griffin, appointed Canadian sales representative, AMERICAN NICKELOID CO., Peru, Ill.

George P. Myers, appointed assistant general sales manager, Industrial Finishes, PITTSBURGH PLATE GLASS CO., Pittsburgh.

Walter A. Baumstark, appointed mid-western regional manager of sales, THE CARPENTER STEEL CO., Alloy Tube Div., Union, N. J.

David M. Petty, Jr., appointed superintendent, Mechanical & Electrical Dept., BETHLEHEM PACIFIC COAST STEEL CORP., South San Francisco Plant.

Robert E. Creamer, appointed district sales manager, HANSON-VAN WINKLE-MUNNING CO., Matawan, N. J.; and **William E. Bridgett,** becomes district sales representative, Cleveland.

John V. Moran, Jr., appointed section head, Special Publications Section, THE INTERNATIONAL NICKEL CO., INC., New York.

F. L. Whitney, appointed chief engineer, WALTER KIDDE CONSTRUCTORS, INC., New York.

HAROLD E. OLSON, elected executive vice-president, The Andrews - Knapp Construction Co., Inc.

JEROME OTTMAR, elected vice-president, Metals & Controls Corp., Attleboro, Mass.

W. L. WOLFE, appointed assistant to vice-president—Sales, Jones & Laughlin Steel Corp., Pittsburgh.

DR. CAMERON G. HARMON, becomes head of the Ceramics Dept., Horizons Inc., Princeton, N. J.

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Wood handles are longer, formed to fit the operator's hands. Steel channel legs and reinforcements are designed for maximum leg clearance. Write for new Wheelbarrow Catalog No. 63A.

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Sterling WHEELBARROWS

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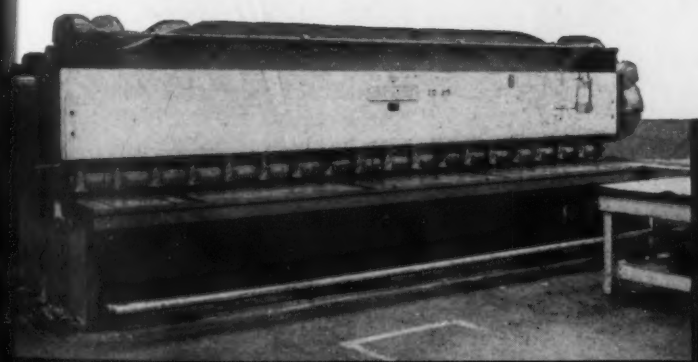
CINCINNATI Shears at CONVAIR



This $\frac{1}{4}$" x 18' Cincinnati All-Steel Shear, one of the Cincinnati units at Convair, has the length to cut full length standard sized sheets.

Photos: Courtesy Consolidated Vultee Aircraft Corp., Fort Worth, Texas.

Cincinnati All-Steel Shears at Consolidated Vultee Corporation are shearing sheets straight and true in the important production of the world's largest bombers.

Illustration shows a $\frac{3}{16}$" by 18' Cincinnati Shear, one of the Cincinnati units at Convair. Aircraft production requires unusual length as well as unusual accuracy in shearing. Cincinnati furnishes shears to the aircraft industry in lengths up to and including 24' of length in $\frac{1}{4}$" thickness.

Cincinnati All-Steel Shears will give you accurate performance. Write for Shear Catalog S-6.

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A

—Personnel—

Continued

Frank E. Seery, appointed district sales manager, Plate & Welding Div., GENERAL AMERICAN TRANSPORTATION CORP.

Dr. Matthew W. Miller, named business manager, Central Dept., MINNESOTA MINING & MFG. CO.; and **Dr. Alvin M. Borders** and **Dr. Harold M. Scholberg,** named associate directors.

J. Ralph Tschantz, appointed export sales manager, THE FLXIBLE CO., Loudonville, Ohio.

Sherman W. Schauer, has been appointed assistant sales manager, THE CINCINNATI BICKFORD TOOL CO., Oakley, Cincinnati.

Sherman W. Richardson, appointed industrial relations manager, OLIVER IRON & STEEL CORP.

Joel Childs, appointed manager, Employee Education, JACK & HEINTZ, INC., Cleveland.

Donald O. Wynocker, appointed Toledo and Northwestern Ohio representative, J. N. FAUVER CO., INC., Detroit.

Werner C. Albrecht, becomes traveling freight agent, WABASH RAILROAD CO., succeeding A. B. Green, who has retired.

Richard V. Colligan, made Cuban representative, FREEPORT SULPHUR CO., and its subsidiary, Nicaro Nickel Co.

OBITUARIES

Edward D. Peden, executive vice-president and director, Peden Iron & Steel Co., Houston, Tex.

Francis S. Denneen, 74, secretary-treasurer and co-founder, The Ohio Crankshaft Co., Cleveland.

L. D. Rigdon. 67, consultant to the manufacturing vice-president, Westinghouse Electric Corp., suddenly at his home in Pittsburgh, recently.

Robert G. Johnston, 83, general superintendent, Donora Zinc Works, American Steel & Wire Co., Donora, Pa., recently.

George C. Montague, 86, Norton Company's first grinding machine salesman, recently.

ELECTROLESS PLATING Produces Hard Nickel Coating

By E. Lamar Gostin
President
Metal Processing Co., Inc.
Cedar Grove, N. J.

◆ Nickel plating by chemical reduction can now be controlled to produce hard, adherent deposits on a variety of base metals . . . Process requires no electric current or anodes, hence, no problems in throwing power . . . Intricate and irregular shapes can be plated uniformly—internally as well as externally.

◆ Plated surfaces respond well to low-temperature heat treatment . . . As-plated electroless nickel deposits equal electroplated deposits in hardness and corrosion resistance but are superior when heat treated in the range of 700° to 950°F . . . Adherence is also improved.

◆ CHEMICAL REDUCTION OF NICKEL from solutions of its salts may be controlled to produce adherent and preferential deposits on most metal surfaces[1, 2]. Even more important, the process of reduction is catalyzed by the nickel itself. As a result, nickel deposition continues as long as there is a sufficient and balanced supply of reducing agent and nickel in solution.

It is distinctly different from chemical replacement which is used to coat steel with copper by dipping it in a copper sulfate bath.

The plate resulting from this purely chemical process is quite unique. It inherently offers several advantages over conventional plating processes. Among these are included the uniform buildup of deposits on all surfaces without local beading and the ability to plate irregular shapes uniformly over internal as well as external surfaces. Because of its peculiarity to respond to heat treatment, its hardness can be increased substantially and its corrosion resistance improved considerably.

[1] Brenner and Riddell, J. Res. NBS 37.31 (1946) RP 1725.
[2] Brenner and Riddell, J. Res. NBS 39.385 (1947) RP 1835.

Early development work, based on the principles established by Brenner and Riddell, was begun by the Metal Processing Co., Cedar Grove, N. J., in 1946 and 1947. It made what is believed to be the first commercial use of chemically-deposited nickel plate under the tradename of Lustralloy.

Removal of electroless nickel plating from the laboratory stage involved lengthy and detailed study of solution compositions, reducing agents, impurity effects, plating tank materials, commercial operating techniques and other factors. The aim was to produce a more economical and stable bath for easy and continuous maintenance under production conditions. More than 3 years of experience in commercial plating shops has proved its success as a new method of nickel plating for industry.

At the present state of commercial development, deposits are semibright to bright in ap-

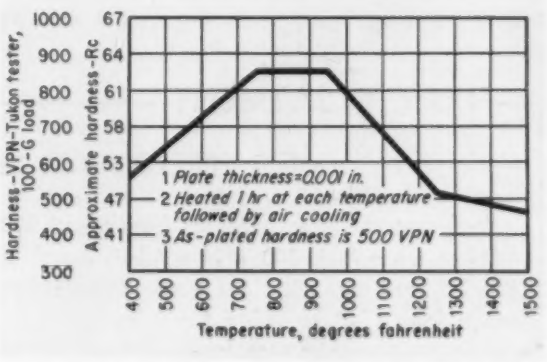

FIG. 1—Low-temperature heat treatment of electroless nickel improves its hardness, wear and corrosion resistance. After heat treating, the coating is better than that of electrodeposited nickel.

Low temperature heat treatment improves characteristics of the electroless nickel plate . . .

pearance. They are smooth, dense and adherent. As plated, they have a hardness of about 480 VPN (Vickers Pyramid Number) which is the same as that for electrolytically-deposited hard nickel. However, low-temperature heat treatment of electroless nickel in the range of 700° to 950°F for 1 hr develops several desirable characteristics which make the coating superior to most electrolytic metallic deposits. Hardness values for heat-treated electroless nickel are given in Fig. 1.

Corrosion tests in salt spray and humidity cabinets show that electroless nickel has about the same corrosion resistance as high-quality electrodeposits from any standard nickel-plating solution. However, after heat treatment at 750°F, electroless nickel is superior to electrodeposited nickel particularly under humidity conditions where it has several times better resistance to attack.

Has high wear resistance

Dry wear tests with a ½-in. drill rod, hardened to 60 Rc and rotated at 400 rpm under a 100-lb load against panels, showed wear resistance to be about the same as for steel case hardened by dry cyaniding. Its wear rate was only one tenth that of unhardened steel. This wear resistance, not wholly explained by the high hardness of the deposit, is believed to be imparted by phosphides in the deposit which aid lubrication. Tendency of the deposit to improve the base-metal finish is also beneficial.

The characteristics of electroless nickel are such as to make it valuable engineering material. Because it eliminates the need for electric current and anodes, plating is uniform in holes, passages, recesses and other hard-to-reach areas where the throwing power of conventional plating is ineffective.

This same property aids the nickel deposit in conforming to sharp corners and edges—the areas where electrolytic deposits buildup and bead locally from high current densities. Burned plate is also eliminated.

The process has certain valuable inherent properties which have enabled it to be applied successfully to many different parts. Stainless steel, titanium, zirconium and mild carbon steel tubing has been plated on both inner and outer surfaces. Deposits are uniform throughout as may be seen in the micrograph of a small tube section in Fig. 2. Where nickel can be used for specific corrosion resistance, electroless nickel is often a good substitute for the more expensive stainless steel, Monel or solid nickel parts.

Deposits are uniform

In another application, a Lustralloy deposit is plated on a small brass gear. The tip of the ratchet tooth has less than a 0.003-in. radius but, as Fig. 3 shows, the deposit is uniform at the tip and the root. Such uniform deposits of controlled thickness of nickel with high hardness, wear resistance and corrosion protection on brass, aluminum or unhardened steel gears are a distinct advantage for many applications.

Electroless nickel plating is particularly useful for watch and instrument gears and worms. For such small parts, wear resistance, accurate thickness of deposits, conformance to contour and corrosion resistance are essential. Deposits are from 0.0001 to 0.0002 in. thick. Parts are easily handled in the bath by means of a suitable cloth or Fiberglas basket. Some agitation eliminates contact marks.

Used on aluminum, brass, steel

Numerous other small parts such as aluminum bushings, brass spinners, steel gears and worms, ball bearings, hollow steel rivets and brass chain, have been plated with uniform deposition on all surfaces. These are shown in Fig. 4. An interesting aspect of the process is that the chain was plated in a roll without unwinding. Coiled wire has been coated similarly. Barrel plating equipment is now being designed for small parts to eliminate racking.

HEAT TREATMENT—

ITS EFFECTS ON ELECTROLESS NICKEL PLATE

Increases as-plated hardness from about 500 VPN to more than 800 VPN which is equal to that of hard chrome. Heat treat temperatures range from 700° to 950°F for 1 hr.

Increases ductility of the deposit enabling it to be bent more than 90° and drawn through dies without fracture when plated on wire.

Improves adherence by diffusing nickel into base metal.

Provides for automatic inspection of plate bond because blisters and peeling signal poor adherence.

Hardness of deposit is unaffected within a temperature of —100° to +900°F.

Electroless nickel has replaced hard chromium in many applications as a means of imparting accuracy of contour, high wear and corrosion resistance to precision tools, dies and molds. An example of this is shown in Fig. 5 in which a steel mold with high precision and deep recesses was plated satisfactorily. Electrolytically-deposited chromium builds up too heavily at high spots and corners, and fails to provide adequate coverage in recesses. Another advantage of electroless nickel for this type of application is its hot and cold hardness properties. The molds (Fig. 5) were made by Alloy Precision Castings Co.

Drills, taps and thread gages have better wear resistance and longer life when plated with electroless nickel. The plated thread gage shown in Fig. 6 is another example where accuracy of form would be lost through electrolytic plating.

Electroless nickel is also valuable for corrosion protection of nuts, bolts and cap screws at temperatures over 450°F—a range where cadmium loses its usefulness. Protection is as good at the thread roots as it is at the tips. Thread form is retained and assembly interference, common with other coating methods, is eliminated.

When heat treating an electroless nickel coating on precision parts, the heating temperature must be compatible with the ability of the base metal to resist deformation at that temperature. For example, an aluminum part cannot be heated above 450°F without destroying its form.

Electroless nickel plating is widely used on a variety of sheet metal assemblies where complex shapes are plated after forming and welding or brazing. This is an important advantage, particularly where surfaces have been made inaccessible by other methods.

Assemblies of different metals, such as aluminum and steel, beryllium copper and steel and Monel, etc., can be handled with the proper cleaning cycle. Use of the process for such applications eliminates the need for expensive conforming anodes.

Less grinding after plating

Another use for this plate is to replace hard chrome on some highly loaded, high-speed bearing journals. The absence of end buildup and beading, minimizes on post-plating grinding. Comparable hardness is produced, plus wettability with respect to lubricating oil. It also eliminates stress cracks usually encountered in hard chrome plate.

The Lustralloy system of operating the electroless nickel-plating bath provides for continuous bath maintenance with regard to both the metal content of the bath and the reducing agent. The nominal plating rate with proper operation is 0.0005 in. per hr. Improved formulation permits this rate to be maintained almost

FIG. 2—Mild steel tubing section enlarged 150 X is uniformly plated on inner and outer walls. The deposit conforms closely to the rough inner wall. The thickness of the plate is 0.0003 in.

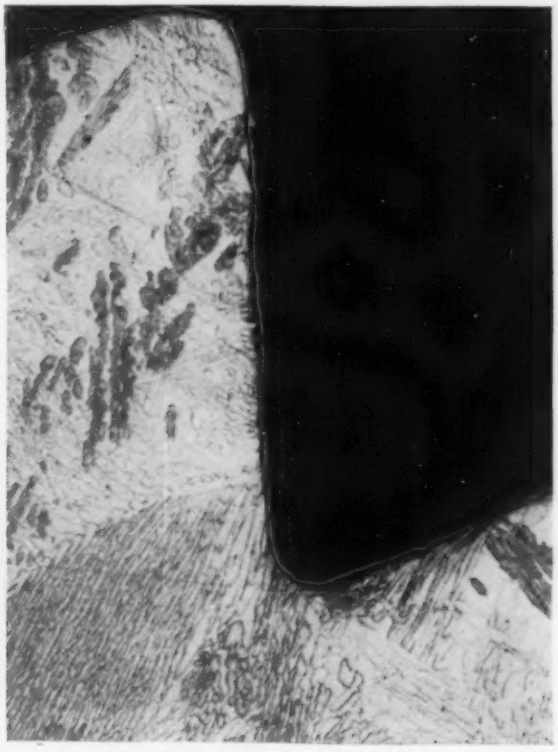

FIG. 3—Plated ratchet-tooth section of a very small brass instrument wheel shows the uniformity of deposit around the tip as well as the root. Electroless nickel gives such parts good wear resistance.

Engineering properties, design freedom possible are major advantages . . . Continuous filtration of bath desirable . . . Deposits uniform.

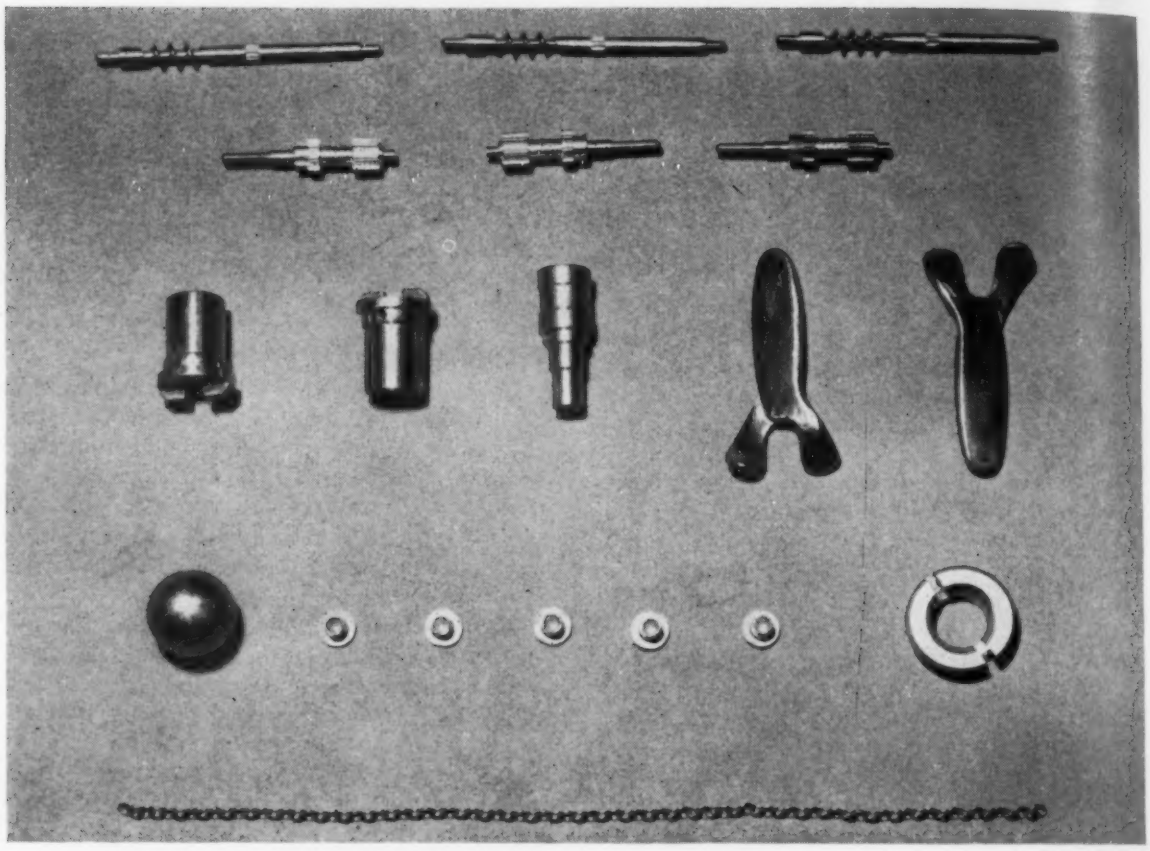

FIG. 4—Accurate thickness of deposit and conformance to contour are essential to such finely made parts.

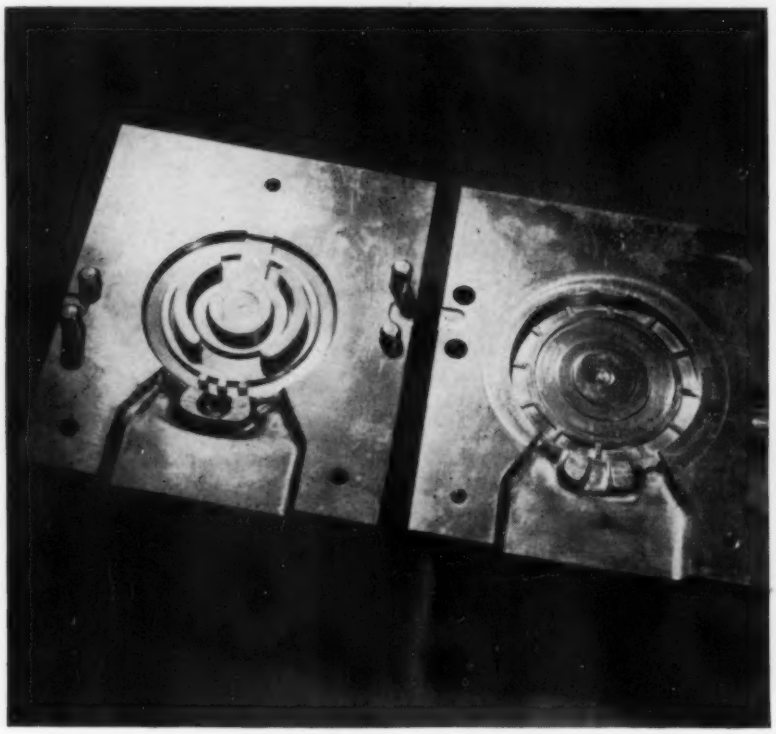

FIG. 5—Precision molds such as these are now plated with electroless nickel because accuracy of contour maintains high precision in deep recesses. Deposits have high wear and corrosion resistance.

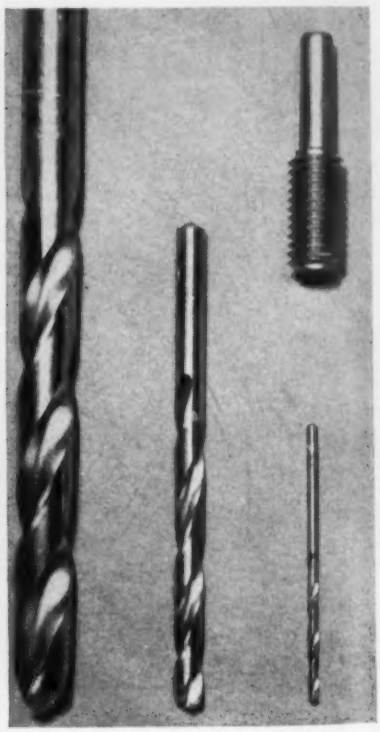

FIG. 6—Electroless nickel gives drills and taps good wear resistance. Thread gages retain accuracy.

indefinitely as compared to the original experimental bath and operating method where the rate falls off after several hours of operation. This plating rate of the improved bath may be maintained with a bath load of up to 100 sq in. per gal.

When using an electroless nickel plate, preplate cleaning of work is the same as that required for electrolytic plating the same base metals. However, the features of this solution are the complete elimination of anodes, generators, tank insulation, ventilation, bus-bars, switches, and other plating facilities and equipment. Consequently, tank equipment is comparatively simple and inexpensive as may be seen from Fig. 7.

Because the bath is operated at 190° to 200°F for best plating efficiency, adequate, external and uniform tank heating is essential. A steam or direct gas-heated hot water jacket is satisfactory. Hot-air heating with electric strip heaters has also been used successfully.

Temperature control is just as important as uniformity of heating. Prolonged overheating to more than 200°F or local hot spots in the tank will cause bath deterioration and an abnormal reduction of free nickel on tank walls or in the bath itself. Such breakdowns seriously increase the effective area being plated and result in uneconomical use of nickel. The penalty for such improper operation is a reduction of the plating rate.

Bath agitation is very desirable because it not only provides a slight increase in plating rate, but also brightens the deposits. This is particularly so on top surfaces of work where dirt and free nickel in the batth will otherwise tend to settle.

Plating tanks should be of thin-walled construction for efficient external heating. They should also have a system for easy draining and cleaning. Suitable tank linings include Permolite, Heresite and cobalt glass.

Continuous bath maintenance is perferable with additions being metered from a gravity feed or by positive feed pumps.

Continuous filtration is not absolutely essential but it is desirable to filter the bath every 3 or 4 days to remove any loose nickel. Stainless steel pumps should be used and the bath temperature lowered to at least 140°F before filtration to prevent plating out on the pump parts.

Work may be racked or suspended in any conventional manner. A compatible lacquer can be used to mask the racks and work.

FIG. 7—Plating equipment for electroless nickel is relatively inexpensive. The process requires no electrical equipment, hence, no problems in throwing power. Plating rate is about 0.0005 in. per hr.

Give the work a belt—

You Can Cut Costs

By R. T. Argy
Sales Engineer
Coated Products Div.,
Carborundum Co.
Niagara Falls, N. Y.

◆ You can get greater flexibility at lower cost in off-hand grinding operations with portable belt grinding . . . Metal removal is more rapid and in many operations a finish grind is not necessary.

◆ A steel idler pulley and arm, serrated rubber contact wheel, and an abrasive belt fit standard horizontal portable grinding units.

◆ The special contact wheel acts like a milling cutter and removes a curled metal chip . . . More efficient metal removal gives higher production rates.

◆ PORTABLE BELT GRINDING, using abrasive belts on a straight spindle portable air or electric tool, offers advantages in lower operating costs and higher grinding output as compared with other grinding methods.

Fast cutting action, ability to follow contours, maximum utilization of abrasive material and ease of handling, are features of this new technique.

The attachment, Fig. 1, is light, compact, and rugged. No special skill is required in its use, an important consideration inasmuch as off-hand grinding and polishing is generally regarded as dependent on operator skill. Operator fatigue is reduced to a minimum and there is no torsion twist on the operator's wrists. Best metal removal results are obtained with light pressure against the work.

The portable grinding attachment consists of a steel idler pulley, steel post and a spring steel split ring. These are used with a rubber contact wheel. It will attach directly to the housing of most portable horizontal grinding tools. A quick, short turn of the control knob releases the eccentric to permit belt change in 8 to 10 sec.

A serrated rubber contact wheel is used for heavy metal removal. A soft type buff or sponge rubber wheel is used for finishing operations.

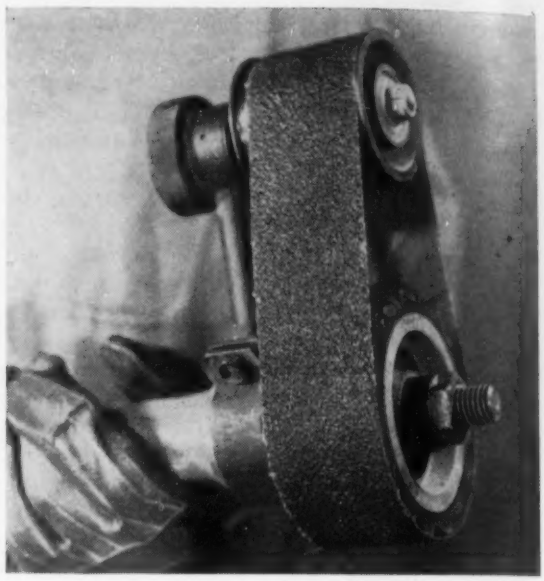

FIG. 1—Portable belt grinding unit fits end of most standard portable grinding tools.

Some stainless steel fabricators use the soft wheels for removing a light weld and blending, in the same operation.

The serrated rubber contact wheel, Fig. 2, gives high points for cutting and low points for chip clearance. Narrow lands with straight leading edges and beveled trailing edges, as in a milling cutter, speed cutting rate of the abrasive belt. With the rubber wheel, belts break down gradually so that almost all abrasive on the belt is utilized.

Performance of a standard serrated contact wheel and a "61" contact wheel is compared in Fig. 3. Using one-third of the initial cut as a throw-away point, the "61" wheel more than doubles the life of the belt. The nearly horizontal curve indicates a steady, high rate of cut.

In normal grinding, by grinding wheel, set-up wheel or abrasive belt or a plain-faced contact wheel, metal particles usually come off in granular form. The cutting action of the serrated wheel produces an elongated curled chip. This gives a fast, cool cut, reduces the possibility of metal distortion from excessive heat. Operator fatigue is also reduced.

Steady spindle speeds are important in achieving highest metal removal efficiency and maximum belt life. Light pressures are recommended. Recommended speeds and hardness of rubber contact wheels for a number of grinding and polishing applications are given in the Table. In general, harder wheels and higher speeds are used

With Portable Belt Grinding

FIG. 2—Serrated rubber-covered contact wheel gives milling cutter action, extends belt life.

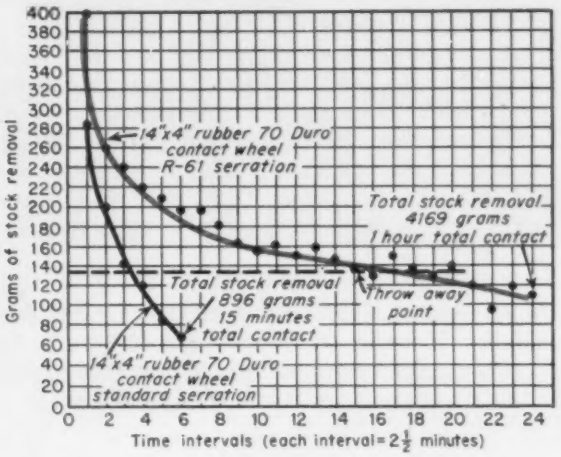

FIG. 3—Stock removal and belt life comparisons between a contact wheel with standard serrations and the "61" wheel. Abrasive belt used in the study was resin-bonded, 14 x 4 in., with 60-grit aluminum oxide grain. Dotted line denotes throw-away point.

for heavy grinding of hard metals. Soft rubber wheels at slow speeds work best for fine grinding or polishing.

Two types of portable belt grinder are available. One uses the serrated rubber contact wheel on the drive shaft, Fig. 1. In the second, the idler pulley runs on the drive shaft and the contact wheel is on the extension arm. This type is suitable for grinding otherwise inaccessible areas such as the inside corner of a stainless steel sink.

Both units come in two sizes, one employing a 4 x 2 x ⅝-in. contact wheel (or idler pulley) and a 20 x 2-in. abrasive belt, and the other employing a 2 x 1 x ⅜-in. contact wheel (or idler pulley) and a 12 x 1-in. belt.

Silicon carbide and aluminum oxide coated abrasive belts in bonds of glue or resin and in grit sizes ranging from 24 to 400 are available. Silicon carbide belts are available in grit sizes 500 and 600.

Resin-bonded cloth is generally used in snagging and heavy weld removal operations where the work may cause ready breakage of the bond. In polishing or metal finishing, where the work does not promote breakage, the lower cost glue-bonded belts are equally suitable.

Silicon carbide belts are used in polishing stainless steel, plastics, polyester, fiberglas, and stone. Aluminum oxide, is preferred for heavy metal removal and finishing operations, for both ferrous and nonferrous operations.

The portable belt grinder simplifies grinding

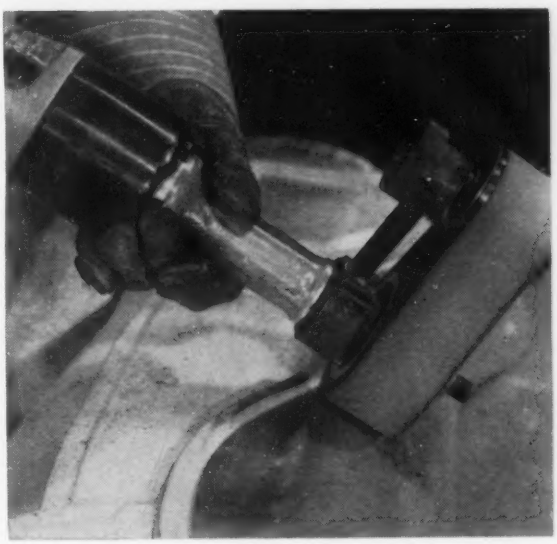

FIG. 4—Portable belt grinding an aluminum casting too heavy and bulky to carry to a stationary grinder.

of the aluminum casting. Fig. 4, which is too bulky and heavy to carry to a grinder. Grinding job was completed in half the time required by other methods. Because the metal is a relatively soft alloy, a medium size grit and medium durometer wheel is used, with lubrication on the belt. For harder nonferrous metals and steel, a coarser belt and harder contact wheel may be required.

Typical applications of the portable belt grinder

You can cut grinding production problems by applying this belt grinding technique . . .

in sheet metal shops include: light weld removal and blending; deburring and blending on concave and convex surfaces.

Fig. 5 shows off-hand grinding of a weld joint on a boiler canopy. This operation was previously performed with a cup grinding wheel, followed, when necessary, by a blending-in with a sander disk. Production ranged from 8 to 10 pieces per hr. Use of 20 x 2-in., 36-grit aluminum oxide grain resin-bonded cloth belt, increased production to 20 per hr.

Weld removal and blending-in operations can be successfully performed with the portable belt grinder. However, when welds exceed 3/16 in. in depth, a grinding wheel should be used first, followed by the belt grinder for final metal removal and blending.

The difficulty in grinding welds on concave surfaces is that the cup grinding wheel and the sander disk disturb a wide surface area around the weld. The belt grinder affects only the weld itself because it conforms to the radius of the concave area.

In deburring, the slack-of-belt technique, Fig. 6, is generally used. The operation is fast and leaves an extremely smooth edge.

Use slack-of-belt

Forging and drawing dies lend themselves to off-hand grinding methods because of their size, weight and complex surface conditions. The entire job of beveling, sharpening and finishing of the small, hardened steel die, Fig. 7, is done with the portable belt grinder. The grinder is best used by working off the contact wheel and using the slack-of-belt. The operation is completed in two-thirds the time required using mounted grinding wheels and points. Moreover, belt grinder leaves no chatter marks.

In grinding and finishing large dies, Fig. 8, both types of grinder are used, because many locations are hard to reach. The job is performed in half the time required for grinding with mounted wheels and points and finishing with set-up wheels.

Sharp corners can be rounded and smoothed with no damage to the abrasive belt. Fig. 9 shows a bronze-brazed corner of a radiator vent being ground using both the contact wheel and slack-of-belt. The rough excess metal has been removed and the operator is now blending in with the slack-of-belt.

In a similar edging operation, Fig. 10, weld metal is removed from a stainless steel component. Coarse grits are used for metal removal and the finer grit sizes up to 600, for blending and finishing. For finish grinding, a lubricant in the form of grease sticks or light oil may be applied to the work piece or directly to the belt.

SPEEDS AND APPLICATIONS

Rubber Contact Wheels

Wheel	Durometer of Rubber	APPLICATION	Safe Top Speeds Sfpm
Super Soft	10-20	Fine polishing on wood or metal. Extreme contour polishing	5000
Soft	20-30	Polishing, fine finishing, contour polishing	6500
Medium Soft	30-40	Stampings, die castings, forgings, contour grinding Plastics if used wet Wood	7500
Medium	50-60	Stock removal and semi-finishing. Flash grinding on softer metals	9500
Medium Hard	60-70	Fast cutting flash grinding on stainless steel and semi-hard metals	9500
Hard	70-80	Grinding gray iron and hard metals	12000
Extra Hard	80-90	Heavy grinding on hardened steel, hard welds, scale removal, forgings	14000

Portable belt grinding on stainless steel and other materials produces a straight line scratch pattern rather than the swirl-type pattern. Fig. 11 compares scratch patterns in a stainless steel cabinet. After grinding, the cabinet will be painted. If the swirl pattern is not removed, scratches will be visible in the finished product. Removal of swirl marks would entail a second operation—set-up wheel polishing—and thereby increase production costs and reduce production rate.

Ability of the portable belt grinder to do the entire grinding in a single operation has resulted in its adoption in a number of applications throughout the stainless steel industry, replacing set-up wheels, sander disks and some grinding wheels.

Some steel fabricators have replaced the serrated contact wheel with a soft type buff.

FIG. 5—Portable belt tool doubled production in grinding weld joints on these steel stampings.

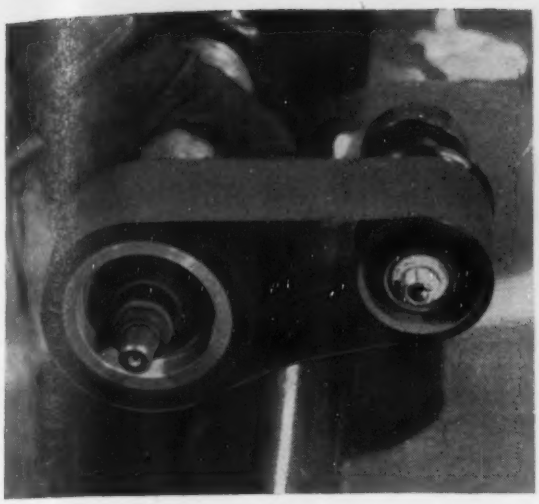

FIG. 6—Deburring and blending a convex surface are simplified by using slack-of-belt technique.

FIG. 9—Contact and slack-of-belt grinding are used on brazed corner of fabricated stamping.

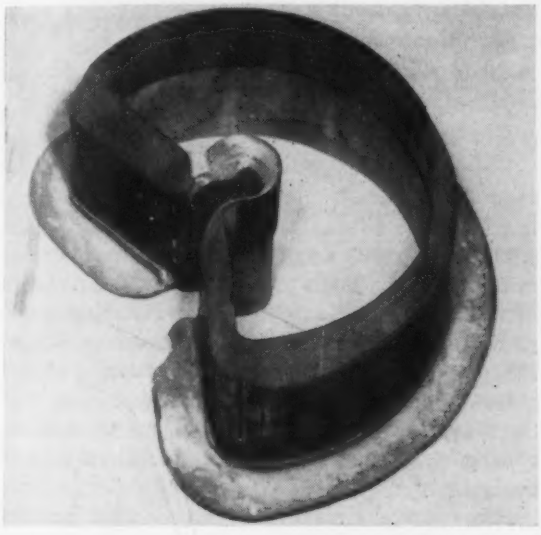

FIG. 7—Beveling, sharpening and finishing on this hardened steel die were done with portable belt grinder.

FIG. 10—Removing weld metal from the edge of a stainless steel component.

FIG. 8—Belt grinding of large die surface was completed in two-thirds time required with other methods.

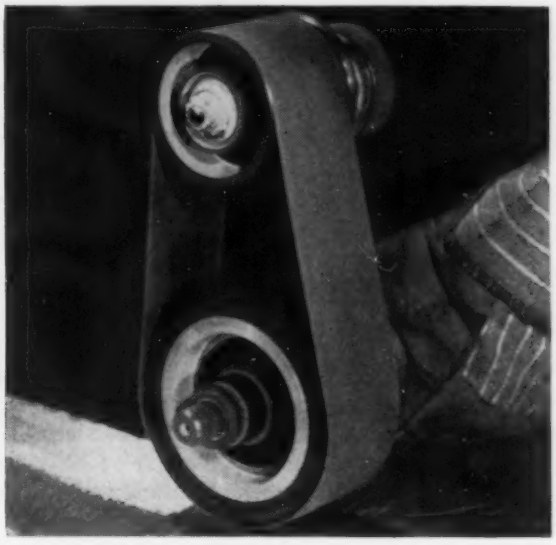

FIG. 11—Straight-line scratch pattern meets finish requirements in stainless steel fabricating.

Three power parley—

COLD EXTRUSION CONFERENCE Outlines Industry Progress, Needs

◆ Cold extrusion of steel is fast pressuring its way into competition with standard fabricating methods . . . Wider use of this process will increase the demand for special equipment to meet cold extrusion's special needs . . . Experts disagree on whether the mechanical or hydraulic press yields best results . . . Industry needs more information on the influence of different heat treatments, particularly with regard to the properties of the finished product.

◆ EXPERTS DISAGREE on whether hydraulic or mechanical presses will yield best results in the cold extrusion of steel. This divergence of opinion at the recent London cold extrusion conference highlighted the growing need for special equipment to meet the unusual demands of a fast growing metalworking process. The meeting, held May 12 and 13, was sponsored by the Sheet & Strip Metal Users Technical Assn. Representatives from England, Germany and the United States presented papers.

Early experience in cold extrusion of steel was gained in Germany where the mechanical press was used. Some development work has tended to follow the German experience. One plant in the United States operates exclusively on mechanical presses. Largest cold extrusion plant in this country making nonordnance parts however, operates exclusively on hydraulics.

Chief drawbacks of the hydraulic press, some engineers claim, are slow extrusion start over the pressure buildup period and fluctuating pressure demands as the punch comes down through the extrusion points.

To overcome "hesitation" during extrusion, pumping equipment must be of larger capacity to rapidly meet changing load demands. General feeling is that maintenance costs on the hydraulics are higher than for mechanical presses.

Even one of the chief proponents of mechanical presses, however, F. F. Massey of Wilkins & Mitchell Ltd., Davlaston, England, admitted that over 5000-ton capacity hydraulics would be necessary due to considerations of stroke and overall size.

Use of eccentric mechanical presses, embodying the best characteristics of the crank press with the capacity of the knuckle press for transmitting heavy loads economically, was recommended by Mr. Massey. Punch stability is improved, the speaker claimed, because lateral thrust in the eccentric drive takes up ram clearance and maintains intimate contact with the sideways. Ideal combination would be an eccentric drive in a ring frame for simplicity of design.

Press drive members of mechanical presses must be designed to withstand maximum tonnage at a greater distance up on the stroke than for normal press operations, E. K. Johansen, Clearing Machine Corp., Chicago, stated. Clearing has built several 1500-ton presses with drive members normally used on 4500-ton machines.

Equipment, materials industry problems

Schedules of operations on the Bliss Hydro-Dynamic press, as used in shell production, were described by E. V. Crane of the E. W. Bliss Co., Canton. A 500-ton press of this type has a pressing speed adjustable to 120 ipm. Fast advance and return speeds are about 1000 ipm.

Chief problems facing the industry and the progress it has made to date were outlined by H. Fischer of Kavel und Metallworks Neumeyer A. G., Germany.

Extrusion materials, die materials, lubrication, heat treatment, and equipment pose major problems for the cold evtrusion industry.

Chief difference between other processes of plastic deformation and cold extrusion is that in the latter case the material is shaped by pressure from all sides. This allows considerably

nigher deformation rates without tearing the material. The material being extruded is stressed to its elastic limit in compression giving a lateral pressure on die walls which is additional to the pressure caused by actual plastic deformation.

Steels suitable for cold extrusion were described by Mr. Fischer. While most work has been done with low carbon steels containing up to 1.2 pct C have been experimentally cold extruded.

Successful use of alloy steels has been reported by the United States and Germany. Heat treatment of steels used in cold extrusion, aimed at limiting extrusion pressures, include spheroidizing, annealing, normalizing and normalizing followed by quenching and annealing. A microstructure of fairly coarse spheroidized carbide particles permits lowest extrusion pressures.

For a given carbide particle size, best properties will be developed if the carbide is distributed evenly throughout the structure, Mr. Fischer reported. The ideal material would be completely free of nonmetallic inclusions and optimum grain size should be 9 to 7 ASTM.

Need data on heat treatment

A recommended treatment soaks the steel above the critical range then water quench to preserve an even carbide distribution. After quenching, the steel is annealed just below the A_1 point (about 1576°F for low-carbon steel). This produces rapid softening but preserves a fine grain size. Annealing should be followed by furnace cooling.

Most cold extrusion applications in the immediate future will probably use low-carbon deep-drawing steels. Nonaging steels may offer advantages when service requirements are severe. Good results have been obtained with low-carbon alloy steels. Industry needs more information on the influence of different heat treatments, particularly with regard to the properties of the finished product. Use of higher-carbon steels is to some extent limited by tool strength and tool wear.

Choice of tool steel for die wear parts has changed considerably since the process was first used in Germany. Originally, steels with up to 12 pct Cr were used, but during World War II the Germans were successful with water hardening carbon steel, particularly for large tools. Recently oil hardening and water hardening steels containing small alloying additions have been used for dies and punches. A water hardening tool steel tried successfully contains 1.1 pct C, 0.3 pct Cr, 0.35 pct Si, 0.35 pct Mn, 0.1 pct V. An oil hardening composition suitable for punches has an analysis of 0.55 pct C, 1.5 pct Cr, 4.5 pct Nc, 0.9 pct W, 0.3 pct Si, 0.4 pct Mn.

Local sollapse and plastic deformation of the tool surfaces are possible under very high pressures. To prevent this the surface hardness must be about Rc 60. Hydrostatic pressure effects on the die, which induce hoop tensile stresses under which the die may burst, must also be considered.

However desirable high hardness is for wear resistance, fluctuating stresses occurring in the tools can lead to fatigue. Adequate toughness therefore, must be insured.

High resistance to softening of a tool steel is necessary, especially for punches. In fast-running presses, punches attain a temperature near that of the deformed material, approximately 392° F. The alloying constituent tungsten, particularly in punches, has a beneficial effect.

Preforge large dies

For hardening dies use of a water jet directed straight onto the most stressed extrusion shoulder was recommended by Mr. Fischer. Incorrect heat treatment of tool steels used in cold extrusion of steel has caused many failures. Well-forged tool steels must be used for punches and dies. Dies of large size should be preforged. This also applies to punches where a pronounced change in diameter is unavoidable to guard against poorly forged core zones at points of highest stress.

Where possible different parts of the tool should be made of different materials. One combination worth consideration would be high-carbon, high-chromium steel for the punch (nitrided) and a die of manganese, nondistorting steel shrunk into a nickel-chromium steel bolster.

Graphitic steels have high resistance to wear and good frictional properties with a low tendency for pickup and scoring. They are free machining and reported to be tougher than similar steels when hardened.

Hard chrominum plating useful

An oil hardening steel of 1 pct C, 2 pct Mn, 2 pct Cr, 1 pct Mo is useful for composite steel dies. Cemented tungsten carbides have been used, but final judgment regarding tool wear is not yet possible.

Surface treatment of tools is important and should be carried out with care, especially during grinding, polishing and lapping.

Hard chromium plating is useful for the repair of worn dies and can be of considerable assistance in preventing wear. Chromium-plated surfaces have a high degree of "slipperiness," and should be considered when fouling is experienced.

Zinc phosphate lubricants have found wide use in cold extrusion. In general the zinc phosphates are economical, easy to control and flexible. Coating must be uniform, adhere tightly to the metal surface, be correctly lubricated. Generally the greater the reduction, the thicker the phosphate coating.

For future reference—

Titanium Can Replace Manganese for Sulfur Control of Steel

Part II

◆ **Titanium in steel has benefits beyond its use as a manganese replacement in sulfur control . . . It ties down nitrogen . . . Titanium carbide formation helps maintain fine grain characteristics at high temperature.**

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Senior Metallurgist
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Niagara Falls

and

R. S. Stewart
Cornell Aeronautical Laboratories
Buffalo

◆ TITANIUM has two outstanding characteristics which affect its properties in addition to its effect on sulfur. The first of these is its effect on oxygen that is present in the steel bath. The second characteristic is the behavior of titanium towards such elements as sulfur, nitrogen and carbon which are always present. With each of these, titanium can form compounds whose stabilities are generally higher than similar compounds of other metals.

Data available concerning the reaction of titanium with the oxygen reveal that titanium ranks second to aluminum, with silicon a distant third in relative deoxidizing powers.[12, 13, 14] When used solely as a deoxidizer, the residual titanium content of the steel is in the order of 0.025 pct or less. Since titanium reacts with oxygen in preference to sulfur and the use of titanium for sulfur control necessitates greater than 0.025 pct Ti when nominal sulfur contents are considered, any replacement of manganese by titanium would result in a fully deoxidized or killed steel. Thus, the use of titanium as a replacement for manganese is limited to killed steels.

Titanium also possesses a strong affinity for nitrogen, although it is less than the corresponding affinity for oxygen. Titanium reacts with nitrogen in preference to carbon, but this preference is not exclusive and cannot be expressed quantitatively. It was thought important to determine whether the titanium reacts with sulfur in preference to nitrogen when both elements are present simultaneously. To determine this, nitrogen analyses were made on a number of the heats used in the experimental rolling. If the steel rolled satisfactorily, it was assumed that all the sulfur is in the combined form, whereas cracking during rolling would indicate insufficient titanium to combine with the sulfur.

In the first case, a high insoluble nitrogen content would be expected since there is sufficient titanium to combine with both nitrogen and sulfur. In the second case, where a deficiency of titanium exists, a low soluble nitrogen content would indicate titanium reacts preferentially with nitrogen. Conversely, a high soluble nitrogen would indicate titanium binds the sulfur first.

Heats which rolled satisfactorily showed low soluble nitrogen contents indicating that the majority of the nitrogen is present as insoluble titanium nitride. In those heats which cracked during rolling, the soluble nitrogen exceeds the insoluble indicating only a slight amount of nitride formation. In this case, sufficient titanium was present to ensure complete combination with the nitrogen if sulfur was not considered. However, only a minor portion of the nitrogen was converted to the insoluble form. It can be concluded that titanium reacts with sulfur in preference to nitrogen when both elements are present simultaneously. The preference, however, is not exclusive since the analyses show that some titanium nitride had been formed before complete combination of the sulfur had occurred.

With nitrogen, titanium forms a very stable nitride. However, in steels, the inclusions, which are fine angular crystals having a pink or yellow color, usually consist of a solid solution of titanium nitride and titanium carbide.[15] Because of its nitride forming ability, titanium can reduce both the total and soluble nitrogen content of steels. Titanium reduces the total nitrogen content of steels because the nitride is insoluble

in liquid steel and its specific gravity is lower than that of steel. It also reduces the soluble nitrogen since the major portion of the nitrogen remaining in the steel will be present in the relatively harmless form of titanium nitride.[16]

Probably the most important effect of titanium on the structure of steel and also on the mechanical properties can be attributed to the formation of titanium carbide. The carbide forming tendency of titanium is the greatest observed with any of the alloying elements normally used in steels.[17] With increasing titanium additions, the amount of iron carbide in the steel is progressively decreased and is completely eliminated when the titanium content exceeds four times the carbon content provided that the titanium combined with the nitrogen is taken into consideration. Since we are concerned with a titanium content of 0.10 to 0.20 pct complete combination of the carbon with titanium would only be possible with 0.02 to 0.04 pct C steels. However, the carbides formed with higher carbon contents will effect the properties of the steel.

The strong tendency towards carbide formation produces a marked difference in the microstructure. First, there is a decrease in the quantity of pearlite corresponding to the combination of carbon with titanium instead of with iron. Secondly, the steel possesses a finer grain size because titanium carbon acts as an obstruction to grain growth, preventing grain coarsening.[18]

Aluminum is just as effective as titanium in obtaining an initially fine grain size but titanium is more effective in maintaining the fine grain characteristics at higher temperatures. This elevation of the grain coarsening temperature by titanium is due to the high solution temperature of titanium carbide. The grain coarsening temperature increases progressively with the amount of titanium and a grain coarsening temperature of 1900°F can be obtained in a 0.30 pct C steel with an approximate residual titanium content of only 0.17 pct. This temperature is considerably higher than that which can be obtained with aluminum. Moderate titanium additions are also thought to be of assistance in eliminating "duplexity," the simultaneous occurrence of both fine and coarse grains.[19] An addition of 0.035 pct Ti has also been found to prevent the occurrence of fading another grain size ir-

How much would Ti desulfurizer cost?

From an economic viewpoint, the comparison of titanium and manganese is not at all favorable to titanium. However, in time of a national emergency, from the standpoint of defense, expense would not be a governing factor. The usual method of using manganese for sulfur control is the standard high carbon grade of ferromanganese which, at present prices, sells for approximately 11¢ per lb of contained manganese. Titanium alloys normally used for addition to steel vary from 55¢ per lb of contained titanium for high-carbon ferrotitanium, to approximately $1.30 per lb of contained titanium for the low-carbon ferrotitanium alloys. Because of the low efficiencies obtained with the high carbon alloys, low-carbon ferrotitanium should be used for comparison purposes. Even the fact that titanium was proven to be three times more effective than manganese does not overcome this price handicap.

To obtain a manganese content of 0.50 pct, assuming the residual manganese from the openhearth to be 0.15 pct, it would be necessary to add 7.8 lb per ton of manganese based upon an efficiency of 90 pct. On a yearly basis, using the steel production figures for 1951 and assuming 30 pct of the annual production to be killed steels, this would amount to 122,669 tons of manganese costing approximately $27,000,000 or 86¢ per ton. To replace this added manganese with sufficient titanium for sulfur control, using 65 pct efficiency as the average titanium recovery, would require 3.6 lb per ton or 56,617 tons of titanium per year at a cost of $147,000,000 or $4.67 per ton. Similar figures for a 0.75 pct Mn steel show that 13.3 lb per ton or 210,290 tons of manganese would be required at a cost of $46,264,000 or $1.47 per ton. An equivalent titanium replacement would amount to 97,057 tons or 6.1 lb per ton which would involve an expense of $252,000,000 or $8.00 per ton of steel produced. Even on a partial replacement basis, the higher cost of titanium would be reflected. If ½ of the manganese required for the 0.75 pct Mn steel mentioned above were to be replaced by titanium, 105,144 tons of manganese plus 48,528 tons of titanium would be required, resulting in a total cost of $149,300,000 or $4.73 per ton.

It has also been mentioned that there is not enough power in the United States to make sufficient ferrotitanium to match the manganese output, most of which is a blast furnace product. We know that titanium can only replace manganese in fine-grained killed steels which amount to an estimated 30 pct of our annual steel production. Since the residual manganese content from the openhearth process is approximately 0.10 to 0.20 pct, it would be necessary to replace the difference between this amount and 0.50 pct which is the average manganese content of killed steels. Using steel production figures for 1950, the ferrotitanium necessary to replace the manganese, as outlined above, would amount to approximately 300 million lb. The production of this quantity of ferrotitanium by the aluminothermic process would require approximately 2½ billion kw hr to produce the required aluminum for the reduction. It is assumed that a similar power consumption would be necessary to produce this quantity of ferrotitanium by the arc furnace method.

Low impact strength resulting from strain aging can be controlled with titanium . . .

regularity.[20] A fine grained structure, in itself, has certain effects such as shallow hardening, increased toughness and a wider heat treating range which, for certain uses, is quite desirable.

Another characteristic of most steels that will be affected by a residual titanium content of 0.10 to 0.20 pct is that of quench and strain aging. Quench aging follows a heat treatment which permits supersaturation of hardening constituents in a rapidly cooled alloy. These constituents are subsequently precipitated, either on extended holding at room temperature or by shorter times at slightly elevated temperatures, which cause a decided increase in hardness and tensile strength and a lowering of ductility. Such a reaction is of relatively little significance, restricted to low carbon steels.

However, strain aging is manifested in many metallurgical changes, all of which are associated with (1) strain induced by cold work and (2) subsequent aging either at room or slightly elevated temperatures. These changes are distinguished from the effects of simple straining or strain susceptibility. They represent the reaction of the alloy to cold work or changes in properties with respect to the annealed state. The two most important consequences are the decrease in toughness as shown by greatly lowered impact resistance, and the gradual reappearance of a jog at the yield point in a stress strain curve of low carbon steels. These effects are separate and distinct since a steel may be susceptible to one and not the other.

Varies with cold work

Both quench and strain aging effects in steels can be minimized by drastic deoxidation.[21] A strongly deoxidized steel is much less subject to the various aging effects.[22] Deoxidation with sufficient titanium is quite effective in controlling that consequence of strain aging which results in low impact strength.[23] With the addition of 0.10 pct Ti, this type of strain aging was practically suppressed, indicating that this effect can be controlled by titanium as effectively as with aluminum.

The second consequence of strain aging, the gradual reappearance of the jog at the yield point in a stress strain curve, cannot be controlled by deoxidation but is the result of small amounts of carbon and nitrogen that remain dissolved in the ferrite.[24] Either carbon or nitrogen, individually, dissolved in the ferrite can effect the return of the yield point.[25] The amount of titanium necessary to prevent the return of the yield point appears to vary with the amount of cold work which the steel receives prior to aging.

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For foods, oils, chemicals—

New Resin Linings GIVE BETTER CONTAINER PROTECTION

By David E. Hartman
Vice-President
Vorac Co.
Rutherford, N. J.

- Wider use of steel drums, pails and cans for the food, special oils and chemical industries lies ahead.
- Drum linings formulated from the new epoxy resins offer unusual resistance to chemical attack . . . The new linings are nontoxic and withstand cracking, denting, scratching.
- A new drum reconditioning industry has been made possible by use of improved plastic lining materials . . . Use of rebuilt drums has effected substantial savings in steel.

◆ NEW ORGANIC LININGS which retard corrosion, prevent contamination and enhance the appearance of metal pails, drums and cans have introduced the metal carrier into the food, special oils and chemical industries.

Latest coating of this type has an "Epon" resin base. This lining, Vorliner No. 44, developed by the Vorac Co., Rutherford, N. J., combines high flexibility with unusual chemical resistance. The liner withstands attack from a great variety of materials. It is nontoxic, resistant to most acids and oils, and withstands the cracking, scratching, denting and other physical abuses containers normally meet.

Linings used by the container industry, in general nontoxic, include:

Linings made from the oleo resins, used to package some foodstuffs, withstand very mild chemical attack and are economical.

Vinyl based linings are flexible and have good adhesion. Their resistance to heavy alkalines and inorganic materials is good, but they have poor resistance to most solvents. Because of their relatively high rate of moisture vapor transmission, the vinyls are subject to attack or loss of adhesion in the presence of mild aqueous solutions.

Phenolic linings have shown a high degree of chemical resistance to a great number of materials packaged in metal containers. Pigmentation and modification with other resins affects the phenolic-based linings. Their resistance is particularly high against chemicals of an acid nature, foodstuffs and aqueous solutions. Mild attack and some gradual decomposition occurs in the presence of various degrees of alkalinity.

Due to the basically brittle nature of the phenolics they tend to flake off metal under reverse impact tests. Phenolics, therefore, have some limitations where containers are subjected to hard usage.

Because the phenolics lack flexibility and are subject to decomposition in the presence of alkali, coating manufacturers have sought all-

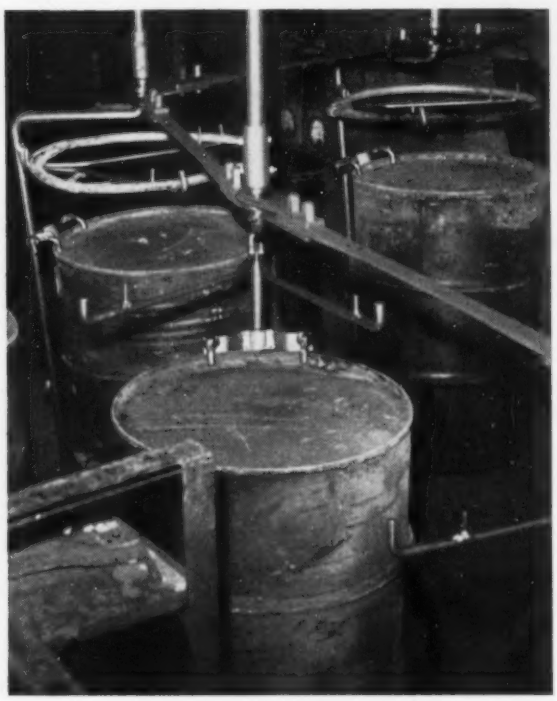
Linings withstand shock and hard usage . . . Wider use of reconditioned drums is possible . . . Organic lining bar to corrosion.

purpose coatings. Introduction of epoxy resins led to use of these resins in lining formulas. Extensive tests showed that these resins, properly catalized, were more highly resistant to a wider range of chemicals than other previously used resins. Epoxy resin linings, such as Vorliner No. 44, when baked on have excellent adhesion to metal and unusual mechanical flexibility. They withstand shock and hard usage. The lining material is available in a variety of colors.

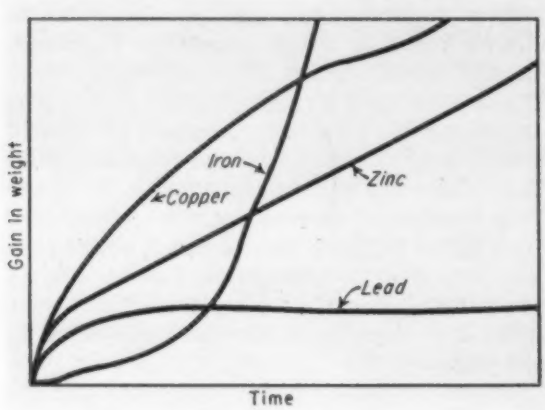
Why drum linings fail

Chemical corrosion starts as soon as metals are brought into contact with nonmetallic elements and atmospheres. The more complex the environment and the more dissimilar the metals, the more complicated is the corrosion process. Surface condition, physical state and composition of the metallic container as well as the chemical components of the surrounding parts determine the nature and time of corrosion reaction. Temperature, movement and contact with metal surface, the nature and solubility of the contact products, humidity, atmospheric pollution and dust all contribute to disintegration of the metal.

Film forming characteristics of certain metals indoor-exposed to summer atmosphere are shown in the graph. Coatings of metals cathodic to the base metal will show pinhole corrosion which may in time perforate the base metal. In production of the Vorac coating every effort is made to secure a nonconducting condition.



UNIQUE "BELT LINE" assembly carries used drums into grit blaster for thorough cleaning inside and out.



CORROSION-TIME relationship of metals in air.

How to prepare drums

Physical structure of the metal surface affects adhesion, porosity, uniformity and smoothness of the coating or lining. Proper and thorough cleaning of the base metal permits the organic lining to act as an effective physical barrier to corrosive elements.*

* Industry Gets Chemically Clean Steel Drums, The Iron Age, Jan. 15, '53, p. 100.

Recommended pretreatment of an 18-gage openhead steel drum prior to application of the liner material is as follows:

Formed shell tops and bottoms are cleaned to remove oxide scale and corrosion elements. With cold-rolled steel, a solvent wash is used. With hot-rolled steel, pickling and phosphating or grit blasting is recommended.

Because of the plastic lining's adhesive qualities, shell, tops and bottoms may be double seamed after coating and baking. This facilitates the production operation.

After cleaning, the drum is passed to a spray booth where the lining is applied. A conveyor carries the drum into an oven to bake the lining. Linings on new steel are generally applied to develop ¾ to 1 mil dry coating thickness.

Usually one coat is sufficient. Under critical use a two coat application, developing to 8.0 mils dry film thickness is used. Baking temperatures, depending on the lining used, run 250° to 500°.

Where double coats requiring two spray applications and two baking cycles are necessary, ovens are often installed in tandem. Exterior coating is then applied to the lined drum at another spray booth. Frequently the exterior coat requires baking to provide hardness, high gloss and protection for the finished container.

The above procedure may be varied by treat-

DRUM HEADS clamped on turntable running counterclockwise into grit blaster. At right is dirty head entering blaster, at left clean head just emerging.

CLEAN DRUM on spray booth getting first coat of Vorliner No. 44. Drum rotates for fast even coating.

FILM PROPERTIES, CORROSION DATA*

Vorliner No. 44, in both clear and pigmented systems, when cured as recommended, has exhibited exceptional resistance to boiling 20 pct sodium hydroxide, boiling water, 10 pct and 50 pct sulfuric acid, 10 pct nitric acid, oleic acid.

Specific Film Characteristics

Pencil Hardness	6H
Sward Hardness	45 to 55
Tabor Abrasion Resistance	16.6 mg per 100 cycles
Weathering (accelerated)	Unaffected in 9 mo (test continuing)
Exterior Durability	Unaffected in 9 mo (test continuing)
Salt Spray Resistance	Unaffected in 1000 hr
Cold Check Resistance (–40°F to 200°F cycle)	Unaffected after 25 cycles
Flexibility (bend test)	Unaffected by 1/8 in. bend
Impact Resistance	Greater than 28 in. lb
Boiling Water	Unaffected

*Shell Chemical Co.

ing the shells, tops and bottoms separately. One gallon of liner will cover 20 to 22 drums or 175 to 200 5-gal pails with one coat.

Prior to discovery of effective lining materials, reuse of drums for a great variety of foods, chemicals and oils was limited. Today, through the epoxy resin linings and other protective coatings, a new container reconditioning industry has been opened. Linings make possible the reconditioning and reuse of openhead steel

LARGE SPRAY BOOTH where second coat liner is applied. Drum is rotated on two spindles permitting operator to completely cover inside of drum. Operator at right moves finished drum to oven.

Coating should be applied evenly and baked on to have a smooth, tight appearance . . . Use with product best corrosion test.

drums. Conservation of steel by this method is a major economy factor in industry.

A typical operation is that of the Bayonne Barrel Co., Newark, N. J. The plant uses modern conveying equipment to cut handling costs. Openhead steel drums received at the reconditioning plant are sorted, stacked and cleaned inside and out. Cleaning usually involves flame treatment or heavy hot caustic baths. In some plants, the openhead drum is grit-blasted inside and out, after flame treatment, to remove scale or deeply imbedded contamination. Reforming operations reshape the drum and head. These operations include dedenting, rerolling and reshaping top and bottom chimes and rolling hoops.

Reconditioned drums often are given two lining coats because of the less perfect condition of the metal surface. Usually an exterior coat dresses up and protects the outside of the drum.

Testing methods—how to select a lining

To test adherence, nontoxicity, inert quality and attractiveness of linings, use two lined test cups obtained from the drums or lining manufacturer. Strike one cup with a ball pean hammer. Then fill both cups with the product to be packaged and note resistance and package life.

Simplest corrosion test of a protective coating consists in exposing a specimen of known thickness or coating weight to a given environment and observing the period of time during which the coating provides satisfactory protection. Variability of environment may markedly affect the results.

While standardized laboratory corrosion tests have been established, the many new products and chemicals that may be transported in metallic containers do not make reliance on these standard tests feasible. Standard tests include field corrosion, exposure to atmosphere, soils and liquids. There are also laboratory tests available for determining resistance to impingement and intercrystalline attack, corrosion-fatigue, salt spray, total and partial immersion.

Most effective test is to simulate as closely as possible the conditions, uses, products, environments and atmospheres encountered in transportation of a particular product.

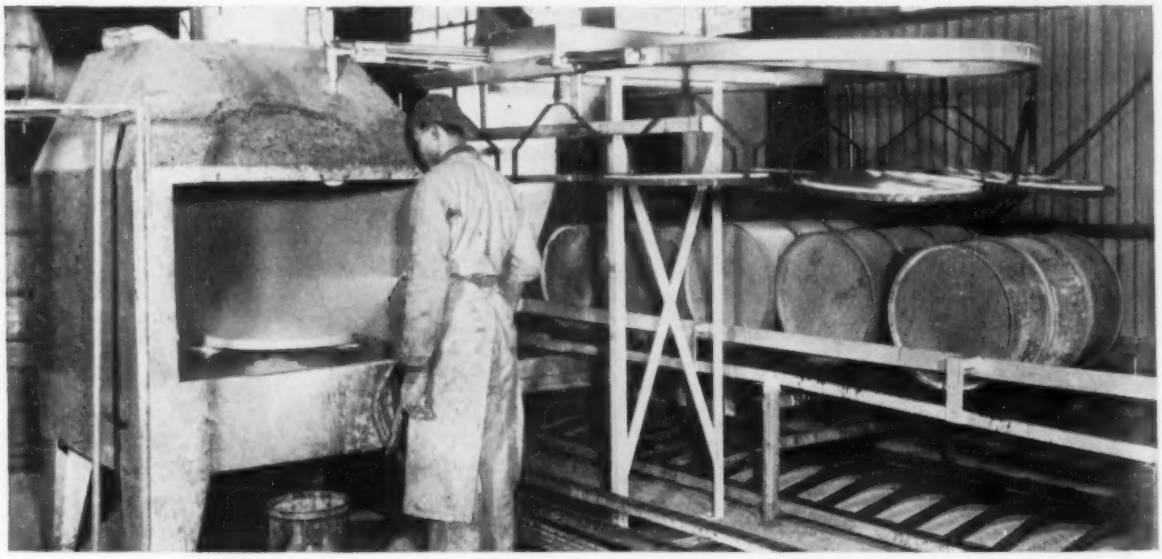
Most conclusive test is to fill a number of drums or containers with the product to be transported and subject them to the actual use and conditions, including denting and bouncing. When making such tests the following points should be watched:

Coating should be applied and baked as directed and have a smooth tight appearance.

Dent the drum above and below liquid level particularly on the rolling ring. This is actual service experience. Failure often occurs at the moisture vapor line. As this is above the liquid, it is easily discernible.

During the test period the package should be observed regularly to determine the time and degree of failure, if any.

Lining failure may take the form of pin-holing and pinpoint rusting. As deterioration continues, blisters and bare patches appear with rust creepage. In some cases, the coating parts from the metal and becomes a loose envelope inside the package. Often decomposition begins as extensive blistering with subsequent peeling and rupture with rust. Again some coatings dissolve and little or no material remains on the steel after the test period.



DRUM HEADS are given second coat of Vorliner at this spray booth. At right, chain conveyor line carries drums into second oven for final baking. Baked coating is smooth, tight. Outside "dress" coat is also applied.

Aircraft engine heat deflector

...ON THE FARM

Cream separator bowl base

...stainless castings cut costs

Considerable savings in both material and machining time are effected when Crucible Stainless Steel Sand Castings are used. And here are two good examples.

The heat deflector — which protects vital turbine assembly parts in an advanced model aircraft engine — was cast by Crucible from AMS-5363A (Type 347) stainless . . . in conformance with rigid aircraft quality standards. Previously this part had been completely machined from a solid forging. The cast part performs the same job, but at a substantial saving in manufacturing cost.

The bowl base for a dairy cream separator was cast by Crucible from CF-20 (Type 302) stainless. To permit fast and efficient finishing in automatic machine tools, the casting must be held to close tolerances. Also, it has to be free from porosity, shrinkage, gas holes, inclusions or any defects that in the finished part would interfere with cleanliness or violate food laws.

Both the heat deflector and the bowl base applications exemplify how steel and machining time may be saved by using a stainless steel casting instead of machining from bar stock or a forging. If you make a product that must resist corrosion, consult Crucible regarding the advantages of producing it from a stainless sand casting.

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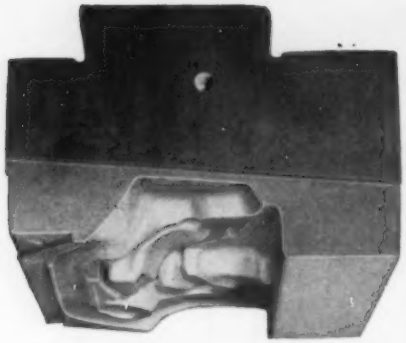

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Technical Briefs

HEADER DIES:

Standardized carbide nibs cut costs, improve production.

Standardization of carbide nib dimensions for bolt, screw and rivet heading operations is now making it possible to produce 93 pct of all production requirements from standard off-the-shelf nibs.

Stemming both from a better grade of carbide for nibs and combination of important nib proportion factors into definite design principles, such standardization today enables most major screw, bolt and rivet producers to decrease machine down-time for die changes to step up production, maintain better tolerances and lower die costs per piece.

Can Be Drilled, Turned

Nibs, made from Carboloy grade 190, can be held to close and consistent tolerances and can be readily drilled and turned.

Important proportions in carbide header die assemblies are: The relation of the inside diameter to the outside diameter of the nib; and the nib outside diameter to the casing outside diameter.

Controlling Factors

The inside diameter of the nib is determined by the pitch diameter of the part (outside diameter of the part in case of rivets) plus a small amount of stock for finishing.

Here are two factors controlling the nib outside diameter:

(1) The OD must be *larger* than the maximum head size to be formed. (Otherwise the less wear-resistant steel casing would wear.)

(2) The OD must be small enough to allow for an ample casing wall to support the nib. (OD of casing should be twice the nib OD or better.)

None of these presents any particular difficulties, but the combination of the factors led to some definite design principles. First of these is that the Carboloy standard nibs for any particular size of bolt, rivet, or screw are now given the maximum OD permissible considering item (1) above.

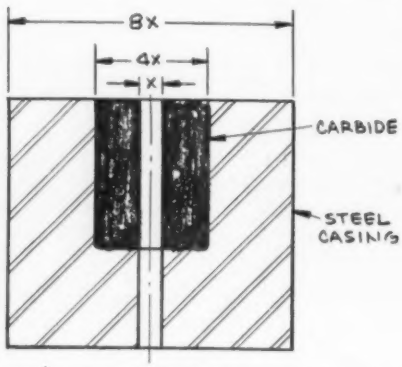
This provides a nib diameter that runs around four times the bolt diameter (ID of nib). Since head diameters practically never run more than 2.3 times the screw size (usually much less), there is ample carbide for the job.

Work Is Confined

Nib lengths now are standardized to handle the majority of bolt lengths for each size. To do this, an extra ⅛-in. of nib length was allowed. This makes it possible for the work to be confined within the carbide, and have the knock-out pin always inside the nib.

In connection with nib length, the best practice is to confine the entire shank of the part in the carbide portion of the die. For exceptionally long bolts, standard nibs can be used effectively by combining hardening of the back part of the steel die casing. This gives a better bearing for the knock-out pin and provides more balanced die wear.

The inside diameter of cored nibs also is standardized so that they are far more adaptable in producing standard size bolts, screws and rivets, etc.—with minimum finishing.



BASIC PROPORTIONS of carbide header die assemblies are important.

IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 87. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

In designing carbide dies, several factors should be considered. While the carbide grade used for heading work is considered tough and soft as compared to other carbides, its hardness and modulus of elasticity are much greater than steel. This means that the carbide does not deform or "give" to the same extent as steel dies.

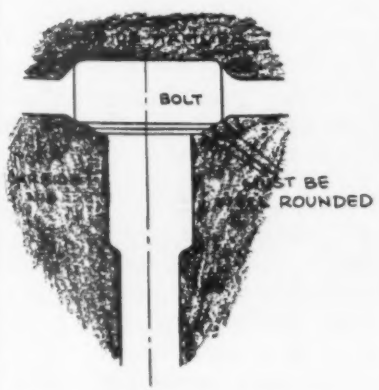
Leave Clearance for Flow

In practice, this means that space for the work material to flow into is essential, and is the major reason why a steel bolt head should not be completely confined in a carbide die. Excess stock on the head of a bolt may permanently damage the die. It is satisfactory to recess the die for washer faces, but not for the major portion of the head.

Best practice is to leave a slight clearance around the edge of the bolt head cavity so that any excess metal can "flow" out in the form of a small flash. Usually the flash is so small that it is immaterial even if not removed. In the case of washer-face bolts, this is no problem.

Eliminate Sharp Corners

Another item for best performance is to eliminate sharp corners in the die or hammer. Such corners develop high stress concentrations and sometimes result in the breaking off of sections of the carbide. It is much better to leave a fillet in all corners.



DIE MAY BE RECESSED for washer faces but not for major portion of head.

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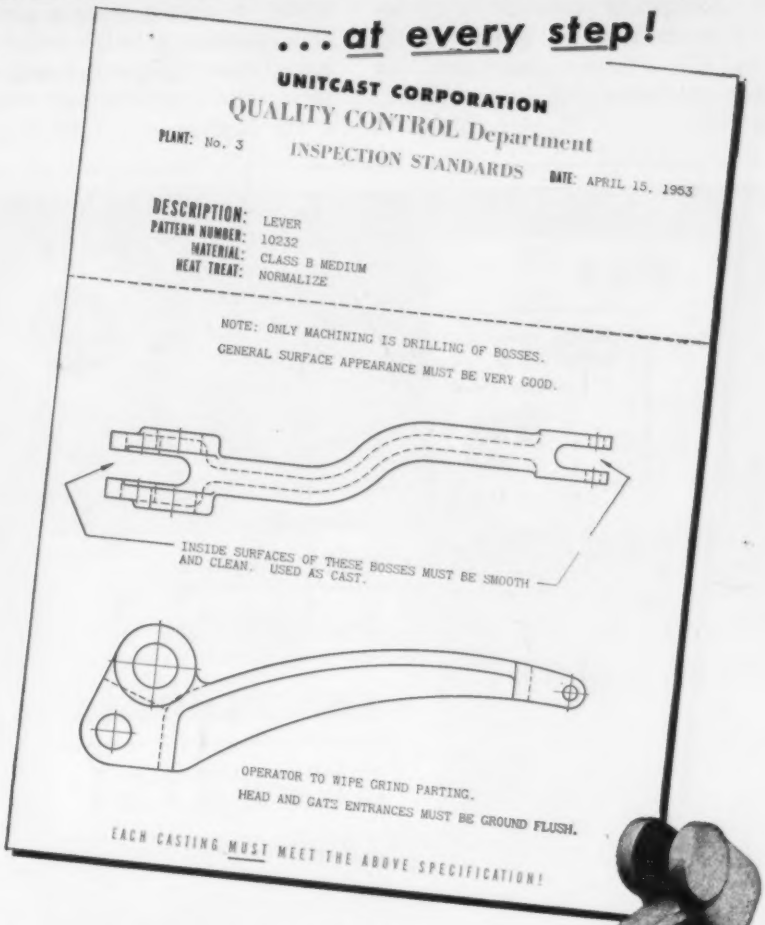
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QUALITY CONTROL Department
PLANT: No. 3 INSPECTION STANDARDS DATE: APRIL 15, 1953
DESCRIPTION: LEVER
PATTERN NUMBER: 10232
MATERIAL: CLASS B MEDIUM
HEAT TREAT: NORMALIZE
NOTE: ONLY MACHINING IS DRILLING OF BOSSES.
GENERAL SURFACE APPEARANCE MUST BE VERY GOOD.
INSIDE SURFACES OF THESE BOSSES MUST BE SMOOTH AND CLEAN. USED AS CAST.
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NOISE AND VIBRATION:

Lower motor maintenance, less annoyance possible.

Practical methods of reducing annoying sounds from electric motors, and increasing life of equipment by eliminating unnecessary vibration were recently suggested by Paul Richards at a meeting of the National Industrial Service Assn., in New York City. Mr. Richards is Service Manager of the Electro Dynamic Div., General Dynamics Corp., Bayonne, N. J.

Three methods exist for reducing annoying sound levels.

(1) Reduce all sounds from rotating parts, such as a fan on a rotor, or armature or a series of slot openings through which high velocity air is passing and chopping against a stationary part.

(2) Reduce sound of magnetic reactions on the motor frame coupled to the air through vibrating surfaces.

(3) Reduce unnecessary noises caused by ball bearings.

A 6-blade periphery of fan blades running close to a stationary part at 1800 rpm would create a sound having a frequency of 180 cycles per sec. This noise can be reduced to a minimum by increasing the clearance of the fan or by using a fan with blades set at an awkward angle.

Reduce Coupling

A second method of lowering the sound level is to reduce the coupling between vibrating parts of the motor and the atmosphere or structure supporting it.

A motor mounted on a light gage plate base or structure which would couple vibration in the motor frame to an effective diaphragm, resulting in relatively high level sound waves in the air was cited.

Recommended solution is to pay close attention to the mounting of all vibrating parts so that they are effectively isolated from adjoining supports and building structures.

Third method for reducing the sound level of electric motors is to install sound absorbent material or, as a last resort, to isolate the area with sound-proof walls.

ALUMINUM FOR TOOLING:

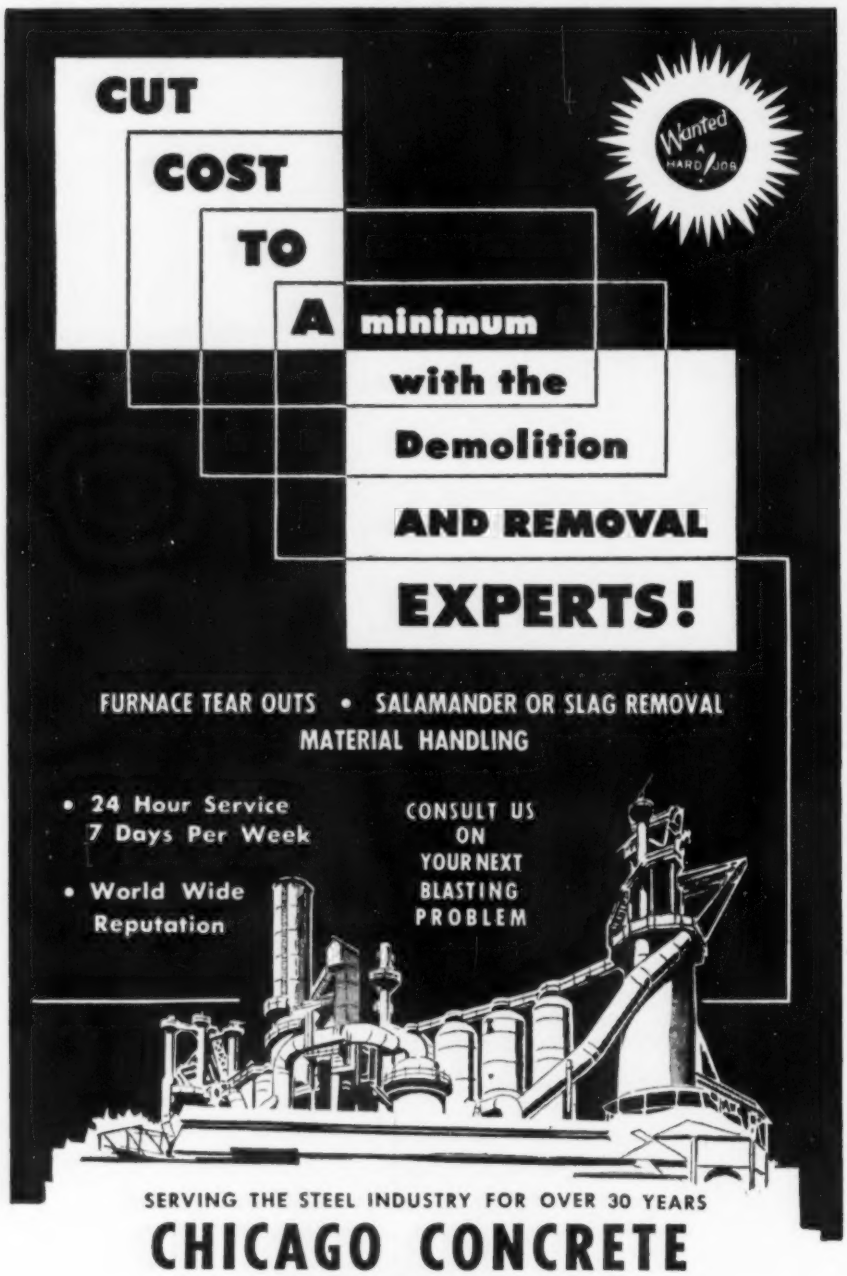
Cast plate, bar available from Reynolds for tool work.

Tool quality cast aluminum plate and bar precision machined for high finish and flatness, have been added to the Reynolds Metals Co. line.

Cast aluminum plate and bar, precision machined to high finish and flatness are now available for tool and die use.

Cast aluminum plate, because of its fine molecular grain structure, high tensile strength, high surface finish and flatness, is used for construction of form blocks, form dies, jigs and fixtures and other tooling.

The plate will be available in a standard width of 48 in. in lengths of 96, 120, and 144 in. and thicknesses from ½ to 8 in.



PACKAGED CONTROL:

System monitors nuclear reactors. . . . Stress safety factors.

An unusual "packaged" automatic control system to electronically monitor the operation of atomic piles and their related processes has been successfully developed by the Mineapolis-Honeywell Regulator Co.

Co.

Planned as a completely integrated control unit, the system will include a multiplicity of amplifiers, servo-amplifiers, recorders, controllers and servo motors. These will automatically regulate the rate of power generation of the nuclear reactors.

Robot-like Safeguards

Engineers said the new system, conceived more than a year ago in the firm's nuclear engineering laboratory and built upon some 10 years of activity in the atomic energy field, also provides robot-like safeguards against dangerous operating conditions.

The new reactor control system will be especially valuable when linked to other automatic equipment to make feasible the conversion of nuclear energy into electrical power by private industry, G. M. Mushcamp, vice president, engineering, reports.

"Power generation," he explained, "requires absolute control of a variety of conditions including temperatures, pressures and flows. With atomic energy as the primary source there is the additional problem of instantaneously proportioning the nuclear reaction to these conditions. This will be accomplished by integrating the reactor control system with recording and controlling instruments to electronically coordinate all of these operating conditions."

Chain Reaction Controlled

In explaining the operation of the new reactor control system, Muschamp said its initial function is to guarantee a "safe start-up" of the chain reaction. This chain reaction commences when the nucleus of a uranium atom is split under neutron bombardment. As the atom splits it releases more neutrons. These, in turn, split additional nuclei, releasing more neutrons, thus producing a chain reaction. To sustain this reaction a specified number of neutrons must be liberated per second.

Picks Up Pulse

As the control rods are removed to begin this chain reaction, a neutron-sensitive detector in the reactor itself sends out tiny "pulses." These are picked up by an electronic amplifier—one pulse for each neutron detected by the chamber.

Another electronic device counts these pulses, totaling them on a digital register. The operator, by determining the number of pulses occurring per second (or any given period of time) knows the rate at which the reaction is increasing and adjusts the control rods accordingly.

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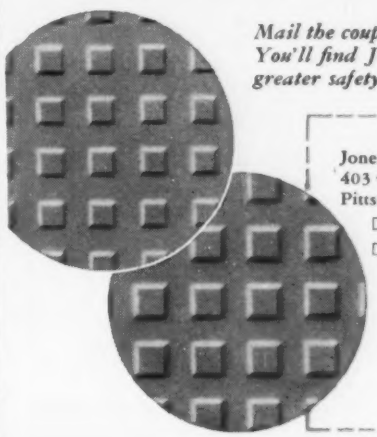

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—Technical Briefs—

SILICONES:

Dow Corning pushes plans for greater silicone production.

A construction program that will quadruple facilities for making silicone products was recently announced by Dow Corning Corp.

Other new developments proudly shown by the Midland, Mich., company on its tenth anniversary include:

(1) A new magnet wire enamel serviceable at 180°C.

(2) Two new Class H varnishes.

(3) New Silastic stocks with outstanding engineering and fabrication properties.

(4) New resins for air-drying silicone paints.

(5) New silicone resins for low-pressure laminating.

(6) Recent additions to the growing silicone lines of water repellents for textiles and leather.

Methyl Chloride Plant

Dow Corning is building a new methyl chloride plant as well as a 6000 kva electric furnace plant for producing silicon from quartz rock and coke.

The company is also erecting a new plant, built in Germany and brought here, for the production of silica "soot." This material is used as a filler to enhance the physical and electrical properties of Silastic.

HIGH FREQUENCY sound waves, set up by quartz crystal transducer, are used with a solvent cleaner to remove dirt from these jet engine fuel control parts. Cleaning equipment is made by General Electric.

Turn to Page 141

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—Technical Briefs—

MATERIALS:

New production process will permit wider use of silicon.

A process for manufacturing pure silicon, which may lead the way to more powerful and less bulky television, radio, and other electronic equipment has been developed by the Du Pont Company.

By this process, the company has opened up a virtually unlimited source of the material—a nonmetallic element—for transistors, which appear to be revolutionizing electronics, as well as rectifiers and probably many other electrical parts.

Silicon is expected to greatly broaden the scope of these developments because it works over a much wider temperature range than other materials available.

Cost Per Unit

Present price tag is $430 a pound—but a pound goes so far that the unit cost per application is only a few cents. The silicon in a tiny wafer used by a transistor costs from two to four cents. The entire production is now coming from a small pilot unit at the Newport, Del., plant of the Du Pont Pigments Dept. Output is now on a scale large enough to supply extensive research programs throughout the country.

Although the transistor has been developed only in very recent years, it is the subject of extremely active research.

While silicon and its compounds are well known in industry, it is the pure element developed by Du Pont laboratories that is likely to become a major factor in the field of electricity and electronics. Du Pont scientists developed a method of making pure silicon in their continuing research for new and improved pigments.

Silicon is able to withstand higher temperatures and handle more power than other semi-conductors.

Germanium has been used in transistors, but recent tests indicate that pure silicon will compete with it in some uses and for many purposes silicon is the only known material that will work.

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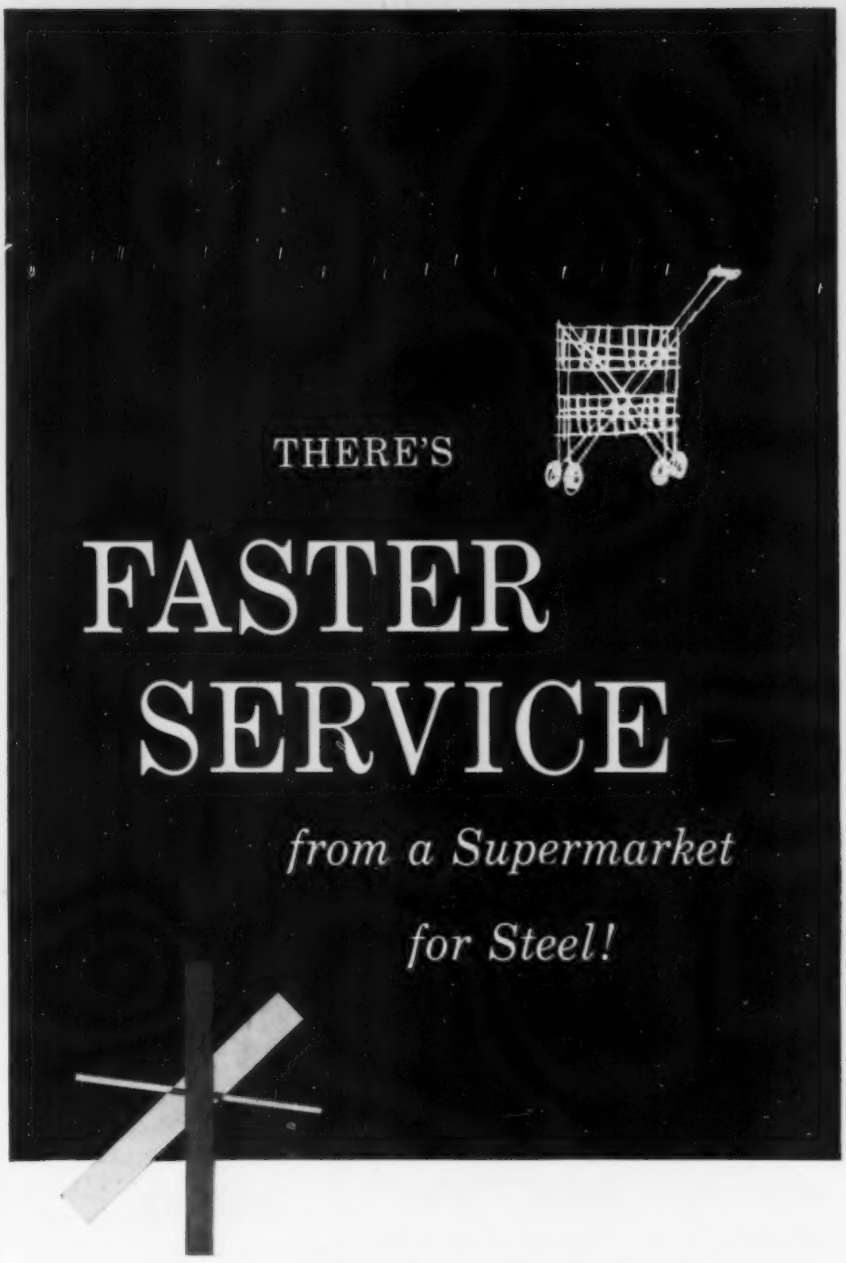

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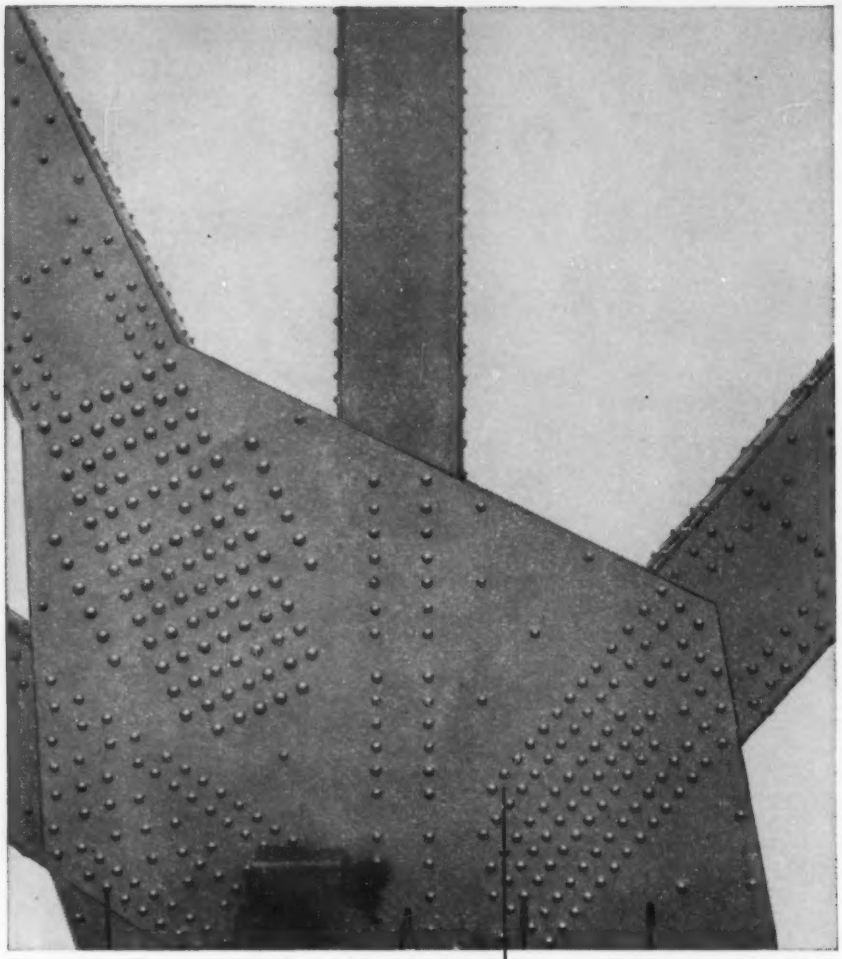

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—Glossary—

INDUSTRIAL ENGINEERING:

Glossary of terms helps cut needless wrangling.

Continued from Last Week

Time Taken: See Actual Time.

Time Ticket: Can be any form used by an employer for the reporting of production and usage of time by an employee.

Time Used: See Actual Time.

Time Value: See Allowed Time.

Time Wage: Compensation based on actual hours worked on the job rather than on units of production.

Timing: The act of making a time study with a stop watch.

Tooling: 1. The act of planning and providing all the tools necessary to perform one or more operations. 2. The tools and equipment on a job.

Tote Board: Same use as tote box but consists of board with holes in which parts are placed.

Tote Box: Metal or wooden boxes designed to facilitate the handling of material and parts in manufacturing operations. Boxes are generally standardized and can be stacked.

Transport—Empty: The motion of an empty hand without resistance toward or away from an object.

Transport—Loaded: A hand movement with a load. The load can be in the form of pressure.

Trunk Movement: A movement of the body which requires the bending or twisting of the body at the waist.

Two-Handed Chart: A chart showing the sequence of hand movements and the time required for each hand in relation to the other hand.

Unavoidable Delay: An interruption beyond the control of an operator in the continuity of an operation. In some cases the interruption is recognized as being necessary.

Unit: 1. A measure of work like a "point" used in some incentive plans. 2. See Unit of Production.

Unit of Production: The base of calculating performance (e.g., tons processed, pieces produced, etc.).

Unrestricted Job: An operation on which the work of the employee is not subject to equipment, process or other operating limitations and without characteristics which tend to limit the full utilization of the employee.

Variable: A term applied to time study elements whose time changes in a predictable manner with variations in the dimensions of the product or modifications in the process. An element for which the performance time varies or is influenced by changes in the size, weight or other dimensions of the product.

Variable Element: See Variable.

Variable Time Elements: See Variable.

Variation: 1. The change that occurs in a given unit or element. 2. The difference between the maximum and minimum time values for a given elemental operation. 3. A change from standard specifications or normal conditions.

Wage Incentive: Any plan for wage payment that relates pay to production. A means whereby employees are afforded an opportunity to increase their earnings by increasing production beyond an established normal performance or other starting point.

Wage Payment Plan: Any arrangement whereby the remuneration for work is paid in money.

Wage Rate: 1. The money per unit of time paid to an employee. 2. The established pay for a given task or service.

Wages: Compensation for performing a given task or rendering a service.

Waiting Time: Delay to an operator caused by lack of material, breakdown of equipment, lack of tools, etc.

Wink: A unit of time measurement equivalent to 1/2000 of a minute.

Wink Counter: A device for measuring time in terms of winks.

Work: Application of physical, mental, or visual effort in an operation to effect a specified end or accomplishment.

Work Content: The amount of physical, mental, or visual effort used in performing an operation.

Work Cycle: 1. A series or sequence of elements which are required to perform a task or yield a unit of production and which recur in like order for each task or unit of production. Upon completion of the last element of the task, the first of the series is again started for the succeeding task or unit of production. 2. All the elements of work regularly required to complete one unit of production.

Turn Page

DOUBLE YOUR PRODUCTION WITH
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DOUBLE RIVITORS
AND CLINCHORS!
RIVITORS
Set two rivets at a time with this new T-J Dual Rivitor! This machine is equipped with 10" hoppers, and tooled to automatically feed and set two ¼" dia. x ⅝" long wagon box head rivets at a time in elevator chain and raddle or elevator flight assemblies for farm implements. Controlled by one foot pedal.
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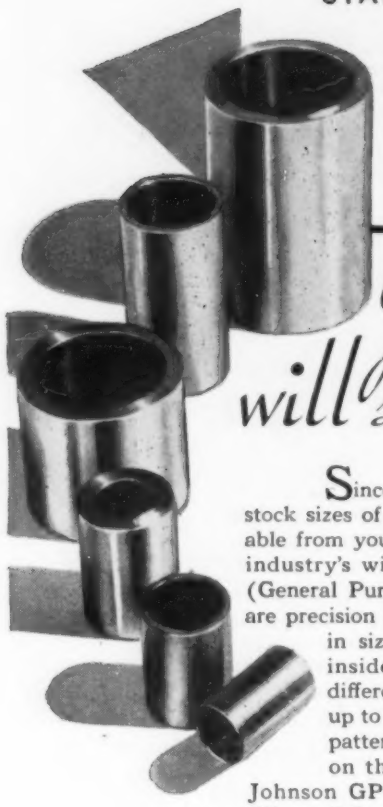

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Glossary
Continued

Work Load: The assigned amount of work to be performed in a given period.

Work Place: The area containing the tools, materials, and working space necessary for an operator to perform an operation.

Work Ticket: A tag or ticket specifying and/or reporting the work performed in an operation. May be used for costing and payroll records in addition to serving as an instruction sheet for the operator.
Also see Time Ticket.

Work Time: Time during which an operator is engaged in useful pursuits on his assigned job as contrasted with idle time, rest time, or waiting time.

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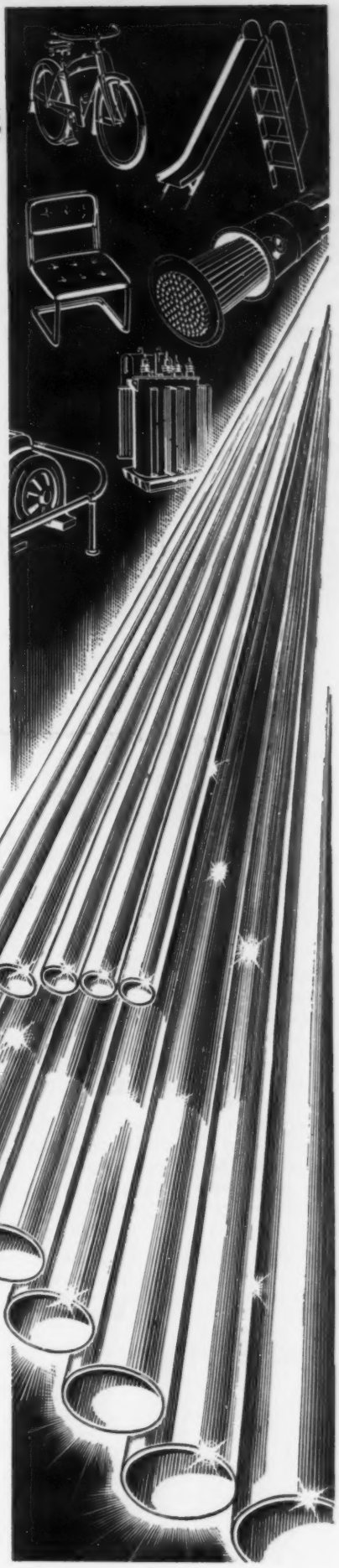

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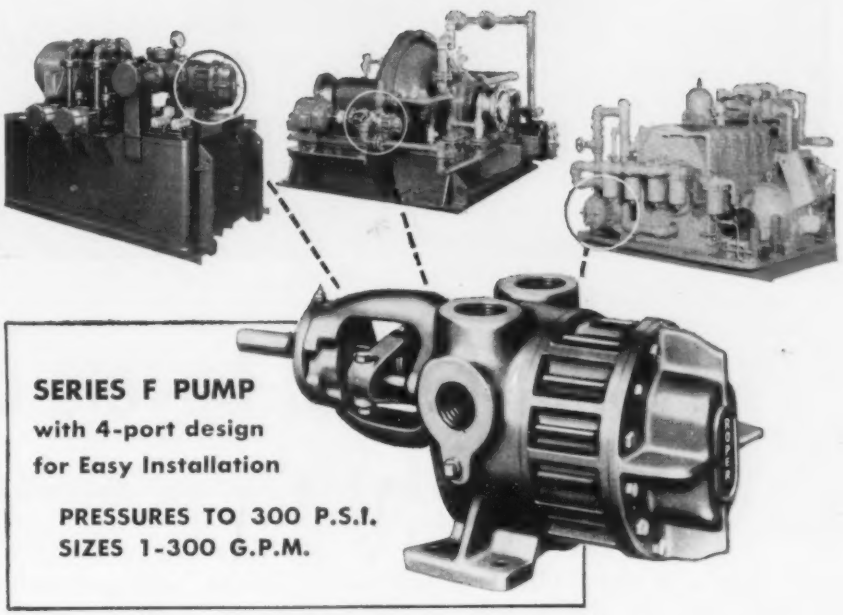

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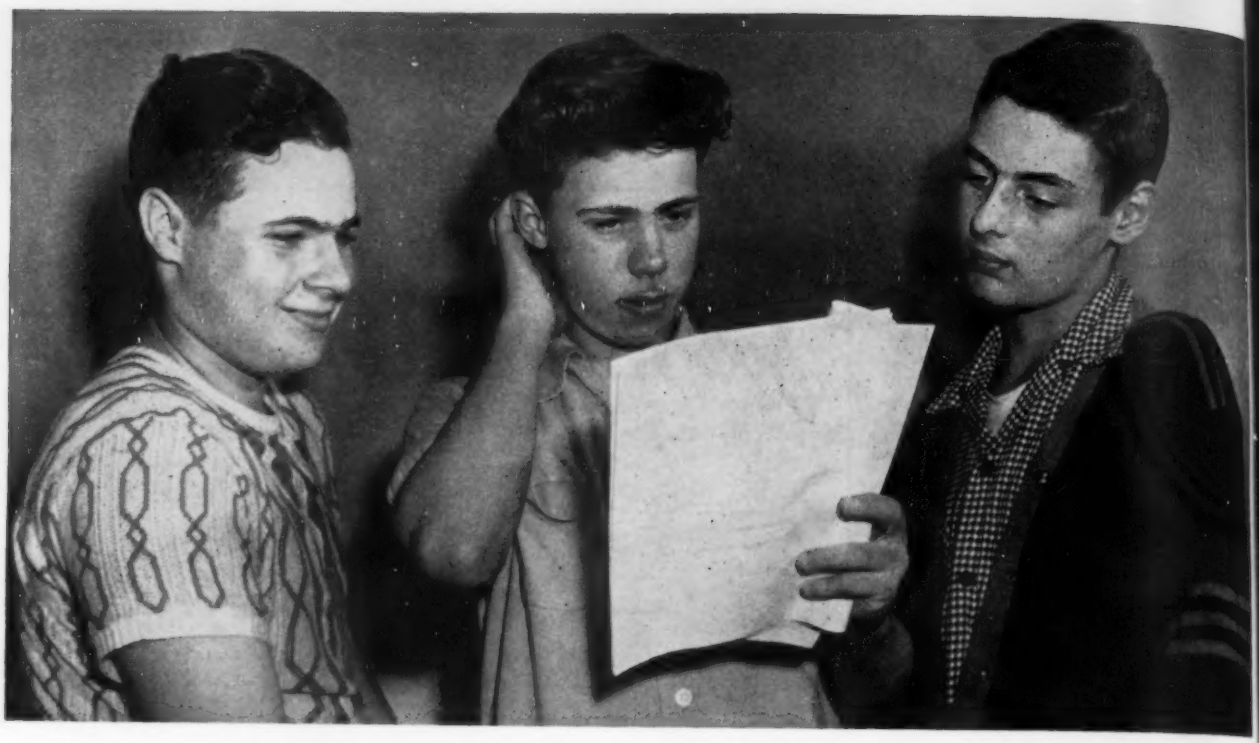

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Peace In Korea Will Not Herald Decline In Steel

Steel boom is due largely to civilian business . . . Defense share is 12 pct . . . No cuts in defense steel expected this year . . . Scrap regains strength after shakeout.

Cease fire in Korea will not herald a decline in the steel market. All signs point to a very high level of business through the third quarter, with perhaps a moderate decline (not a recession) in the last 6 months of this year. Consumer demand is believed virile enough to support production of more than 110 million tons of steel in 1953. Previous high for the industry was 105.2 million tons produced in 1951.

Why It's Tight . . . Here are some of the reasons steel will remain hard to get through most of the year:

¶ The defense program is pretty well set. Even if the shooting stops, steel requirements will remain about the same—at least through this year. About 12 pct of industry capacity will continue to be employed in filling these needs.

¶ Steel order books of producers are practically filled on major products through the third quarter. When books were opened for third quarter business they filled rapidly; little selling was required.

¶ Most mills will enter the third quarter with large carryovers of undelivered second quarter orders. Some of them are a month or more behind on important tonnage products. Since they are already operating at capacity, the only way they can get their order books current is to drop a full month's quota to customers.

¶ Mills still are not able to accept all orders that customers want to place—even for delivery three months hence. For example, one producer reports customers trying to place fourth quarter orders for plates made on its strip mill. Some of these customers have indicated they plan to make long term commitments for foreign plates.

One automotive company is already committed for 56,000 tons of foreign steel in second and third quarters. Very little of this has been delivered.

¶ Although major users are hopeful they will not have to rely on expensive conversion steel after August, they are not convinced their hopes will be realized. There is a lot of pussyfooting on conversion. Purchasing agents are trying to avoid costly commitments that will make them look bad if steel is available at regular mill prices. Yet they want to keep their foot in the conversion door, just in case they need to enter later this year.

One mill that is ready to accept fourth quarter conversion orders finds a lot of people who may want space but none yet ready to sign on the dotted line.

Autos Pace Demand . . . The defense program is not the strongest factor supporting the steel market. Greatest pressure is coming from manufacturers who are finally free to produce and sell all the civilian goods they can.

Nowhere is this competition to be first to reach the consumer stronger than it is in Detroit. The leading auto maker smells a record dollar year and is putting on a terrific drive to attain it. Its competitors are equally determined that any gain will not be at their expense.

New sales-boosting features, originally scheduled for next year, are being thrown into the competitive struggle. Though many believe auto production must decline during the second half, there is as yet no real evidence that it will happen.

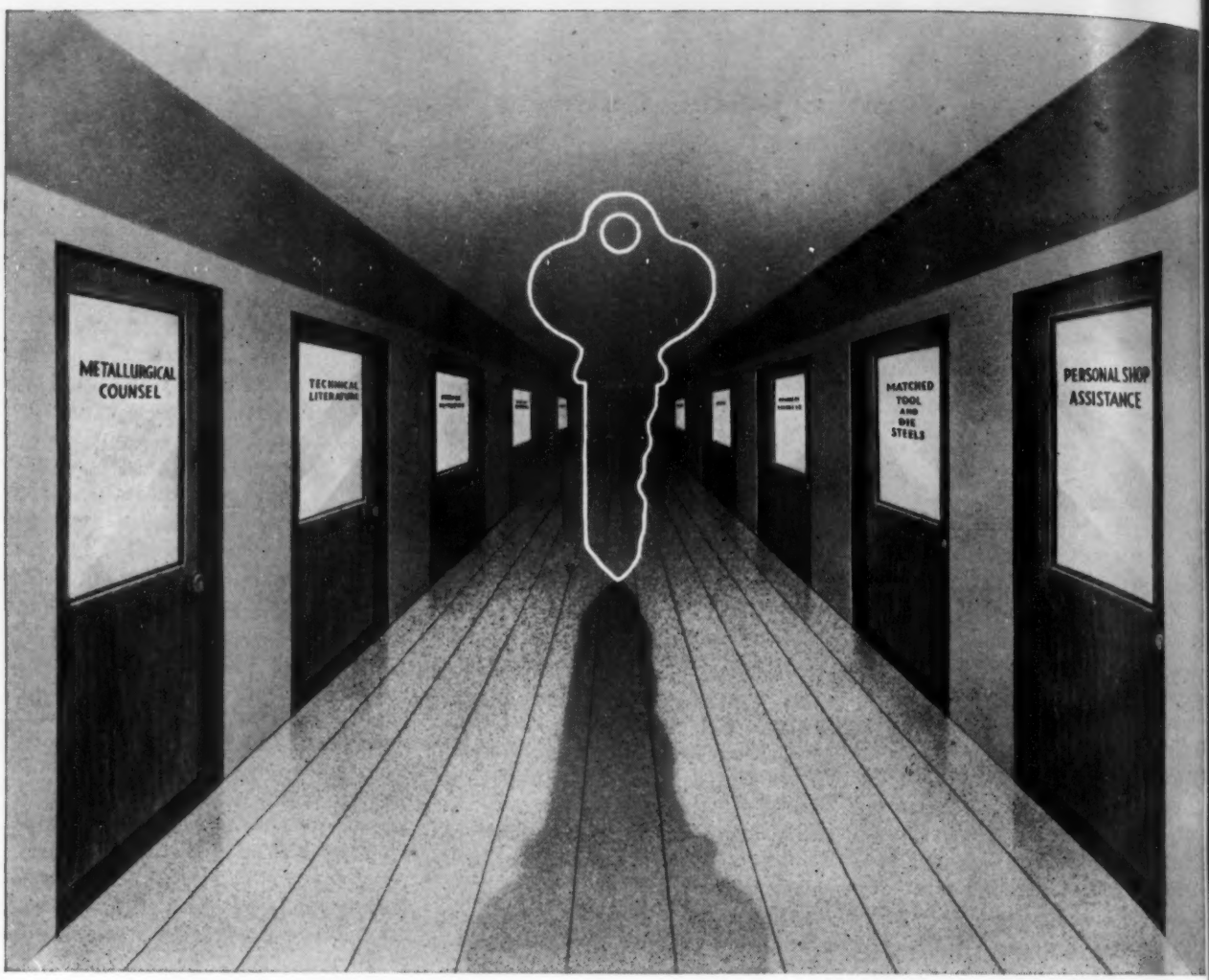
What Cuts Output . . . When the steel industry does catch up with its market the supply-demand balance will not come to rest on 100 pct of capacity; it will dip below. But that will not happen until: (1) The conversion bloom is gone; (2) high cost producers have to give up charging premium prices; (3) mills have trouble filling their order books; and (4) new orders do not keep pace with production and cancellations.

Some or all of these things may happen before the end of this year. But the end of the steel honeymoon will not necessarily signal an unhappy future for the industry. Some steel companies, now straining production facilities to satisfy customers could do about as well or perhaps a little better financially if they were operating a few points lower.

Expect Wage Peace . . . Steel wage negotiations by streamlined committees are reaching the serious bargaining point. Bargaining atmosphere is still unclouded; barring an extremely unusual development, peaceful settlement is expected. Negotiations may reach the home stretch next week. Agreement will likely provide a wage increase of around 10¢ an hr; this would be followed by a price increase of about $4 a ton.

Rising Scrap . . . The price shakeout in the scrap market appears to have run its course. For the second consecutive week THE IRON AGE Steel Scrap Composite Price registered a gain. Increase was $1.00 a ton to $39.87 per gross ton. Increases of the past 2 weeks had been preceded by 7 consecutive weeks of decline and 2 weeks of no change.

Steelmaking operations this week are scheduled at 100.0 pct of rated capacity, down 1 point from last week.



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Market Briefs and Bulletins

Automakers Scout Cancellations . . . Auto steel purchasers are hunting for possible cancellations and other stray tonnages which indicates demand for auto steel is still unsatisfied and that alert purchasing agents are anticipating slowdowns in other industries. Electric mills in the Detroit area are not heavily scheduled for September. There is some reluctance to book too far in advance on expensive steel when there is a possibility that prices will drop later on.

New Ferromanganese Base . . . E. J. Lavino & Co. and Bethlehem have followed the lead of U. S. Steel Corp. and shifted to a net ton pricing basis for standard ferromanganese. Price is $200. Base content was also reduced by both firms to 74 to 76 pct manganese with a premium or penalty of $2 per ton for each 1 pct above or below the base. Net result is a slightly higher price.

Lakes Fleet Moves Faster . . . Despite early season ice slowups in the Sault area, Great Lakes ore fleet is running well ahead of last year's pace. Ore vessels hauled 22,468,520 tons by June 1, compared to 19,152,694 for the same period last year.

Record Limestone Production . . . Michigan Limestone Div. of U. S. Steel last month set a new company record for limestone production. The division shipped 2,157,000 tons from its Calcite plant at Rogers City, Mich., to top its previous high attained in October, 1952, by 100,000.

Navy Out of Paint Business . . . Paint manufacturers can expect an increase in orders as a result of the Navy's decision to close down most of its paint-making operations. The Navy will now buy its paint from commercial sources.

Finished Steel Capacity Doubled . . . Steel industry's capacity to produce finished steel mill products has nearly doubled in the past 30 years, outpacing expansion of ingot capacity which increased 78 pct during the same period, reports American Iron & Steel Institute. Replacement of hand mills by continuous mills is a major factor in the expansion.

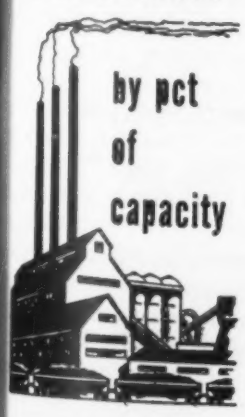
Latest on Steel Labor . . . Last week the steel union asked the industry for an offer. U. S. Steel offered 5¢ an hr, which was immediately turned down. The union has called a top level wage policy committee meeting for this Friday in Pittsburgh to set the limits to which its negotiators will be allowed to go.

Set New Steel Mark . . . For the second time in 3 months, total steel production at Bethlehem Pacific's plants in Seattle, South San Francisco and Los Angeles has broken the company's record. Production in May was 87,265 tons as compared with the former high of 86,384 tons reached in March.

Iron Mine Mechanization Plan . . . France's costly postwar iron mine mechanization program, aided by Marshall Plan funds, is beginning to pay off. Annual output of iron ore from the Lorraine mines was slowly raised to 32.8 million tons in 1951, but by 1958 the same mines are expected to be turning out 53 million tons per year. Some of the new machines enable work gangs to turn out a peak production of 600 to 700 tons as compared with the prewar production average of 5.2 tons.

Warehouse Prices . . . Most steel warehouses have now completed their price revisions to cover recent increases in extra charges (see completely revised price list on p. 160).

STEEL OPERATIONS

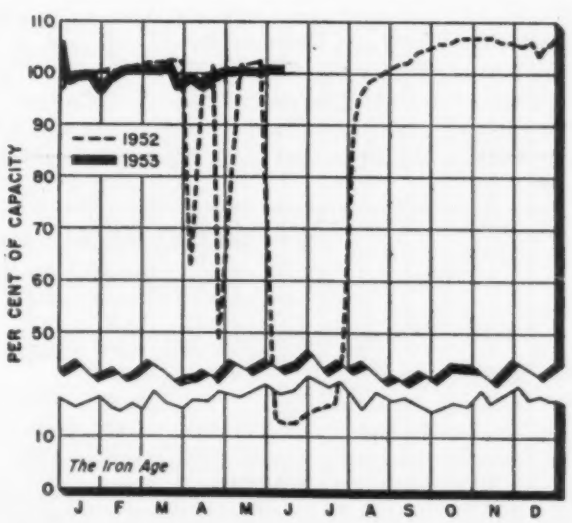


District Operating Rates

District	Week of June 7	Week of May 31
Pittsburgh	98.0	97.0*
Chicago	106.0	105.0
Philadelphia	98.0	98.0
Valley	102.0	102.0
West	106.0	108.0
Cleveland	93.0	97.5*
Buffalo	106.5	106.5
Detroit	105.0	108.0*
Birmingham (South)	101.0	101.0
Wheeling	101.0	102.0
South Ohio River	90.0	90.0
St. Louis	82.5	89.0*
East	88.0	102.0
AGGREGATE	**100.0**	**101.0**

Beginning Jan. 1, 1953, operations are based on annual capacity of 117,522,470 net tons.

* Revised



Lower Aluminum Stockpiling Rate

Producers' gain partial victory over ODM . . . Demand is too high, growing too rapidly to allow heavy stocking . . . M-16 revoked . . . Lead, zinc quiet—*By R. L. Hatschek.*

It's off again—but only in quantity. Producers of aluminum have convinced Office of Defense Mobilization that third quarter stockpiling of the light metal should not get a green light. ODM insisted on at least a yellow one so stockpiling will be done, but in reduced tonnages.

Original government plan called for buying metal at a rate which would keep civilian supply at about the same level it has been running. But demand for aluminum is growing almost daily and supply just isn't that high yet.

Production Climbing . . . Primary producers of aluminum poured 102,071 tons of metal in April, a slight dip from the all-time record of 104,460 tons produced in March. On a daily basis, the April output just tops March.

Illustrating the demand trend is a new product announced by General Electric Co. It's a connector designed for use with either copper or aluminum conductors. GE states the connector was designed because many utility companies are now using aluminum.

Revoke M-16 . . . National Production Authority has killed M-16, lifting all restrictions on the flow of copper, . toll agreements and limitations on inventory and the accumulation of scrap. The agency said that in view of favorable changes in copper supplies so far this year there was no point in keeping the order in effect till the end of CMP on June 30.

COPPER PRICES COMPARED

(Cents per lb)

Year	Electro, Conn. Valley	Lake del'd	Lake over Electrolytic
1946	14.0390	14.0559	0.0169
1947	21.2886	21.2861	—0.0025
1948	22.3278	22.4583	0.1305
1949	19.5033	20.1146	0.6113
1950	21.5349	21.8279	0.2930
1951	24.5000	24.6250	0.1250
1952	24.5000	24.6250	0.1250
1953 (4 mos)	27.7975	28.5680	0.7705
Average	21.4036	21.6158	0.2122

The copper market is staying pretty quiet with no real indications of what demand will be like for July delivery. Nobody's rushing things. Prices of copper futures on the Commodity Exchange ended the first week of trading a bit lower than the first day's business. Custom smelter and ingot maker buying prices for copper scrap are tending to be a bit easier this week.

Copper Comparison . . . Lack of any market quotations on Lake copper in May has thrown much confusion on the statistical pi ture. The accompanying compari son of Lake and electrolytic co per prices in the years followin World War II may shed some ligh by reviewing relationships of th recent past.

Nickel Contract . . . One of th most interesting aspects of th agreement reported last week be tween International Nickel Co. an the Defense Materials Procure ment Agency is the delivery speed The 60,000 tons of metallic nicke and 50,000 tons of electrolytic cop per is to start flowing in Decembe of this year. Monthly shipment will average 1000 tons of nicke and 833 tons of copper.

How? Answer lies in a new process which involves the mining and treating of underground ores that are not now considered commercial grade. Nickel-bearing pyrrhotite will be refined, yielding a marketable iron ore as well as the nickel.

End of Shortage? . . . DMPA feels that this biggest and best nickel contract paves the way to ending the current shortage—ac tually it's better than a 10 pct boost to current supplies. Price to be paid is reported to be approxi mately 29¢ per lb above the pre vailing market price because of higher costs of operation and for amortization of new facilities.

Inco is scheduling nickel pro duction to deliver 690,000 tons in the 5-year period ending in 1953 as compared to deliveries totaling 527,500 tons for the 1945 to 1949 period.

Lead, Zinc Quiet . . . Buyers for lead and zinc were not asserting themselves last week. Most re quirements for June had been covered and July business was not yet forthcoming in any real quan tities. Feeling is generally easy and nobody is looking forward to any trouble in supply. Prices in London eased at the end of the week.

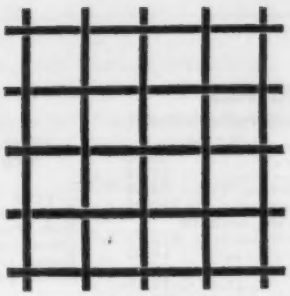
NONFERROUS METAL PRICES

(Cents per lb except as noted)

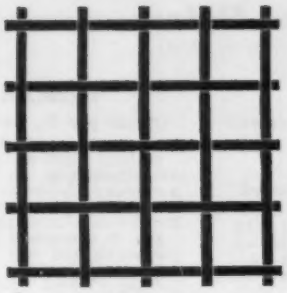
	June 3	June 4	June 5	June 6	June 8	June 9
Copper, electro, Conn.	29.75-30.00	29.75-30.00	29.75-30.00	29.75-30.00	29.75-30.00	29.75-30.00
Copper, Lake delivered	....	....	....	....	....	....
Tin, Straits, New York	95.75	95.50	93.50	....	92.75	92.75*
Zinc, East St. Louis	11.00	11.00	11.00	11.00	11.00	11.00
Lead, St. Louis	13.05	13.05	13.05	13.05	13.05	13.05

Note: Quotations are going prices.
*Tentative

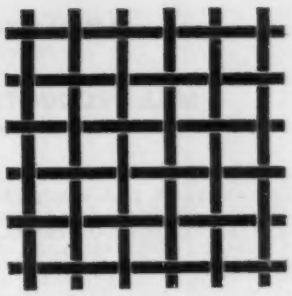
2 Mesh .063"
76.4% Open Area



3 Mesh .041"
76.7% Open Area

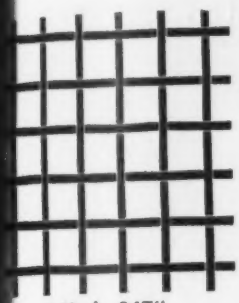


3 Mesh .054"
70.1% Open Area

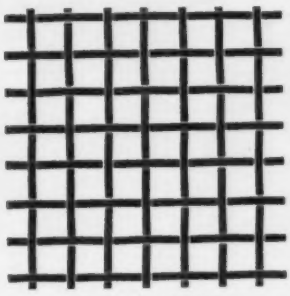


4 Mesh .063"
56.0% Open Area

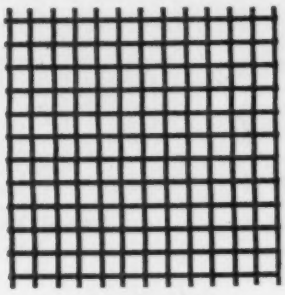
CALL CHASE



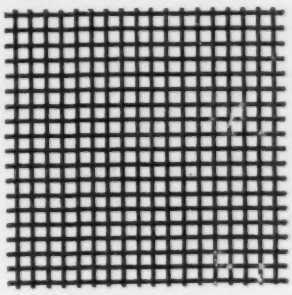
4 Mesh .047"
65.9% Open Area



5 Mesh .041"
63.2% Open Area

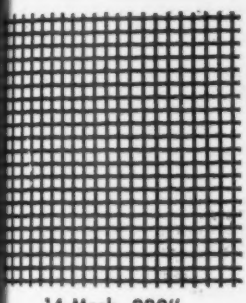


8 Mesh .028"
60.2% Open Area

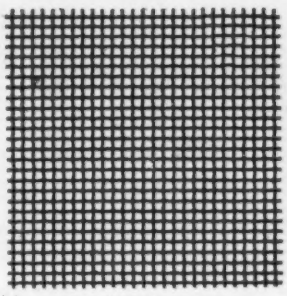


12 Mesh .023"
51.8% Open Area

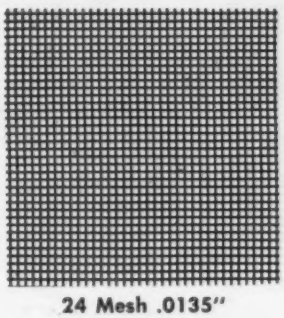
FOR INDUSTRIAL WIRE CLOTH



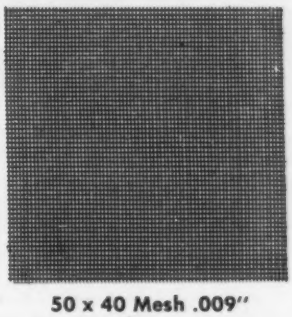
14 Mesh .020"
51.0% Open Area



18 Mesh .017"
48.3% Open Area



24 Mesh .0135"
45.8% Open Area



50 x 40 Mesh .009"
35.7% Open Area

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Atlanta	Cincinnati	Detroit	Los Angeles	New Orleans	Providence	Seattle
Baltimore	Cleveland	Houston	Milwaukee	New York	Rochester†	Waterbury
Boston	Dallas	Indianapolis	Minneapolis	Philadelphia	St. Louis	(†sales office only)

Nonferrous Prices

(Effective June 9, 1953)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188-in., 2S, 3S, 32.9¢; 4S, 61S-O, 34.9¢; 52S, 37.2¢; 24S-O, 24S-OAL, 35.9¢; 75S-O, 75S-OAL, 43.6¢. 0.081-in., 2S, 3S, 34.1¢; 4S, 61S-O, 36.6¢; 52S, 38.9¢; 24S-O, 24S-OAL, 37.2¢; 75S-O, 75S-OAL, 45.7¢. 0.032-in., 2S, 3S, 35.9¢; 4S, 61S-O, 40.6¢; 52S, 43.5¢; 24S-O, 24S-OAL, 45.6¢; 75S-O, 75S-OAL, 57.0¢.

Plate, ¼-in. and Heavier: 2S-F, 3S-F, 30.9¢; 4S-F, 33.0¢; 52S-F, 34.7¢; 61S-O, 33.6¢; 24S-O, 24S-OAL, 35.4¢; 75S-O, 75S-OAL, 42.3¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.4¢ to 80.3¢; 12 to 14, 87.1¢ to 97.2¢; 24 to 26, 39.7¢ to $1.27; 36 to 38, 47.0¢ to $1.86.

Rod, Rolled: 1.064-in. to 4.5-in., 2S-F, 3S-F, 41.0¢ to 36.6¢; cold-finished, 0.375-in. to 3.499-in., 2S-F, 3S-F, 44.2¢ to 38.3¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32-in., 58.4¢ to 45.9¢; ⅜ to 1½-in., 45.3¢ to 42.6¢; 1 9/16 to 3-in., 42.0¢ to 39.3¢. Base 5000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 43.2¢ to 31.7¢; 52S, 52.4¢ to 38.3¢; 17S-T4, 59.0¢ to 41.0¢; 61S-T4, 52.9¢ to 40.5¢.

Extruded Tubing: Rounds, 63S-T5, OD 1¼ to 2 in., 40.5¢ to 59.0¢; 2 to 4 in., 36.6¢ to 49.7¢; 4 to 6 in., 37.1¢ to 45.3¢; 6 to 9 in., 37.6¢ to 47.5¢.

Roofing Sheet: Flat, per sheet, 0.019-in., 28 x 72 in., $1.247; x 96 in., $1.662; x 120 in., $2.077; x 144 in., $2.494. Coiled sheet, per lb, 0.019 in. x 28 in., 30.8¢; 0.024 in. x 28 in., 29.3¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 66¢; 3/16 in., 68¢; ⅛ in., 70¢; B & S Gage 10, 71¢; 12, 75¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam ⅛ to 0.311 in., 77¢; ½ to ¾ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated; 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, ¼ to 5/16 in., $1.43; 5/16 to ⅝ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall; OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(100,000 lb base, f.o.b. mill)

Commercially pure and alloy grades; Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86½	67½	92½
Strip, CR	92½	70½	98½
Rod, bar	82½	65½	88½
Angles, HR	82½	65½	88½
Plate, HR	84½	66½	90½
Seamless Tube	115½	100½	137½
Shot, blocks		57	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	48.51		50.58
Copper, h-r	50.48	46.83	
Copper, drawn		48.08	
Low brass	45.99	45.68	
Yellow brass	42.87	42.56	
Red brass	47.11	46.80	
Naval brass	47.01	41.07	42.33
Leaded brass			39.95
Com. bronze	48.76	48.45	
Mang. bronze	50.73	44.62	46.18
Phos. bronze	70.50	70.75	
Muntz metal	44.91	40.47	41.72
Ni silver, 10 pct	56.56	59.83	62.89

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	20.50
Aluminum pig	19.50
Antimony, American, Laredo, Tex.	34.50
Beryllium copper, per lb conta'd Be.	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismouth, ton lots	$2.25
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	29.50 to 30.00
Copper, Lake, delivered	
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$175 to $185
Lead, St. Louis	13.05
Lead, New York	13.25
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	27.00
Magnesium, sticks, 100 to 500 lb	45.00 to 47.00
Mercury, dollars per 76-lb. flask, f.o.b. New York	$194 to $196
Nickel electro, f.o.b. N. Y. warehouse	66.08
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	56.25
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	85.25
Tin, New York	92.75
Titanium, sponge	$5.00
Zinc, East St. Louis	11.00
Zinc, New York	11.83
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	26.00
No. 120	25.00
No. 123	24.00
80-10-10 ingot	
No. 305	30.00
No. 315	28.00
88-10-2 ingot	
No. 210	38.25
No. 215	34.75
No. 245	30.25
Yellow ingot	
No. 405	21.25
Manganese bronze	
No. 421	26.50

Aluminum Ingot

(Cents per lb del'd, 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	24.75-25.00
0.60 copper, max.	24.50-24.75
Piston alloys (No. 122 type)	22.75-23.20
No. 12 alum. (No. 2 grade)	22.25-22.75
108 alloy	22.50-23.25
195 alloy	22.75-25.00
13 alloy (0.60 copper max.)	24.50-24.75
ASX-679	22.75-23.25

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	23.25-24.00
Grade 2—92-95%	22.25-23.50
Grade 3—90-92%	21.50-22.00
Grade 4—85-90%	20.75-21.00

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	45.14
Electrodeposited	37.98
Flat rolled	45.64
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	79.50
Roller, depolarized	80.50
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over.)

	Heavy	Turnings
Copper	38¾	37¾
Yellow brass	21¾	19¾
Red brass	35¾	34¾
Comm. bronze	36¾	35¾
Mang. bronze	20	19¾
Brass rod ends	19¾	

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	24¾
No. 2 copper wire	23
Light copper	21¾
*Refinery brass	20¾

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	24¾
No. 2 copper wire	23
Light copper	21¾
No. 1 composition	18¾
No. 1 comp. turnings	18
Rolled brass	14¾
Brass pipe	14¾
Radiators	14
Aluminum	
Mixed old cast	12¾—13¼
Mixed new clips	15½—16
Mixed turnings, dry	14 —14½
Pots and pans	13 —13½

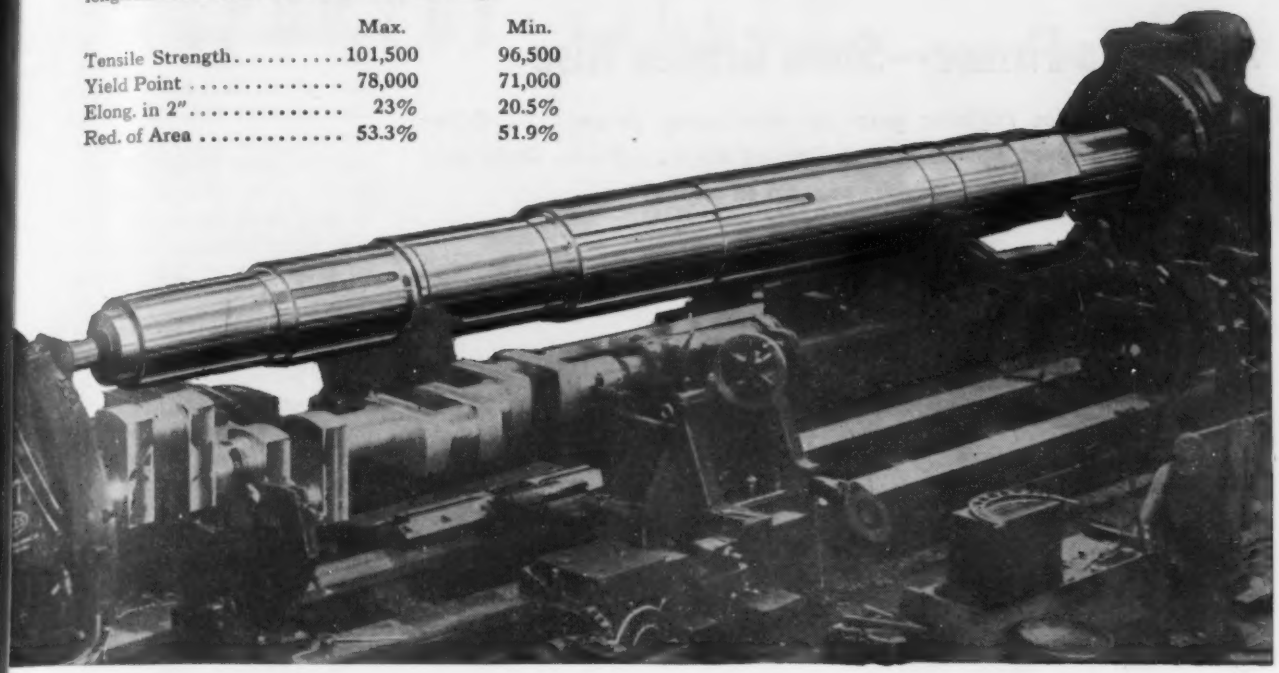
Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	23 —23½
No. 2 heavy copper and wire	20½—21
Light copper	18½—19
New type shell cuttings	18½—19
Auto radiators (unsweated)	13
No. 1 composition	16½—17
No. 1 composition turnings	16 —16½
Unlined red car boxes	15 —16
Cocks and faucets	15
Mixed heavy yellow brass	11½
Old rolled brass	14
Brass pipe	16
New soft brass clippings	16½—17½
Brass rod ends	16 —16½
No. 1 brass rod turnings	15 —16
Aluminum	
Alum. pistons and struts	6 — 6½
Aluminum crankcases	9
2S aluminum clippings	13
Old sheet and utensils	9
Borings and turnings	6½
Misc. cast aluminum	9
Dural clips (24S)	10
Zinc	
New zinc clippings	5½
Old zinc	4½
Zinc routings	3½
Old die cast scrap	3½
Nickel and Monel	
Pure nickel clippings	100
Clean nickel turnings	60 —70
Nickel anodes	100
Nickel rod ends	100
New Monel clippings	33 —35
Clean Monel turnings	25
Old sheet Monel	30 —32
Nickel silver clippings, mixed	14
Nickel silver turnings, mixed	12
Lead	
Soft scrap, lead	10¾—10¾
Battery plates (dry)	5¾— 6
Batteries, acid free	4.25— 4.50
Magnesium	
Segregated solids	15 —16
Castings	14 —15
Miscellaneous	
Block tin	60
No. 1 pewter	55
No. 1 auto babbitt	45
Mixed common babbitt	12 —12¾
Solder joints	16 —16½
Siphon tops	45
Small foundry type	15¾
Monotype	13½
Lino. and stereotype	12½
Electrotype	10¾
Hand picked type shells	8¾
Lino. and stereo. dross	4¾
Electro dross	4¼

NICKEL STEEL FORGING . . . a 58,950 lb. hoist drum shaft, 24" in diameter at its widest portion and 42' 9" long, produced by ERIE FORGE & STEEL CORP. Inspection revealed very fine grain. After being normalized and drawn, actual tensile tests in the longitudinal direction showed the following:

	Max.	Min.
Tensile Strength	101,500	96,500
Yield Point	78,000	71,000
Elong. in 2"	23%	20.5%
Red. of Area	53.3%	51.9%



How Erie Forge Obtains

Superior Properties in Large Forgings

To develop high tensile and elastic properties in large forgings, such as this giant shaft, by heat treatment is much more difficult than with smaller forgings.

For even though dimensions of a large piece may allow liquid quenching, section sizes involved ordinarily limit the cooling rates.

Experience shows that superior mechanical properties in large forgings depend largely on suitable alloy content . . .

Fundamentally, that is why the output of ERIE FORGE & STEEL CORPORATION of Erie, Pennsylvania, includes scores of large forgings produced from nickel alloyed steel.

Nickel, either alone or in combination with other alloying elements, exerts highly beneficial influences. Its strengthening effect on ferrite is independent of carbon content or heat treatment of the steel, while its effectiveness in reducing the rate and temperature of the upper transformation, induces better response to the necessarily milder heat treatments used.

Nickel alloy steels may help you obtain peak performance from vital parts of *your* products or equipment. Send us the details of your problems for our suggestions. Write us now.

At the present time, nickel is available for end uses in defense and defense supporting industries. The remainder of the supply is available for some civilian applications and governmental stockpiling.

SYMBOL OF INCO SERVICE

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Market's Firmer—Steel Grades Rise

Many cities register gains in steel scrap prices . . . Other areas report optimism and firming up . . . Trade feels only direction is up . . . Orders certain to come.

Something's bound to give when inventories that may still be respectable but certainly reduced face up to slim dealers stocks. This week something did. Steel scrap prices in some cities climbed. Two types of pressure have been exerted on the market. On one hand, the consumer has been able to idle along on previously very heavy stockpiles and steady supplies of industrial scrap.

Yet when the consumer idles along dealers lower their yard intake because of a "down" market. Their stocks slim down to the point where the advantage of the consumer in controlling the market is somewhat offset.

This may be happening now in the scrap market as areas that were previously pessimistic over lack of buying and sinking prices suddenly feel some underlying strength in scrap. Optimism gained momentum last week but this week became a stronger force.

In Pittsburgh, openhearth scrap moved up $2 a ton. No. 1 steel moved up $3 in Cleveland and $1 in Cincinnati. Other areas reported market firmness. There was the feeling that prices had leveled off, could go no lower. There was only one direction now for prices—up.

In some centers the feeling of optimism was based on orders that were bound to come late this month as mill stocks eventually were cut down to flatter levels. Orders were bound to come in good volume, peace truce or no peace truce.

Pittsburgh — Openhearth scrap moved up $2 per ton this week on basis of a sale of No. 2 bundles to a district consumer. The purchase price was equivalent to a delivered price of $34 for local scrap. Low phos. and No. 1 railroad scrap rose $2 and $3, respectively, the latter on basis of successful bids for latest lists. Blast furnace and cast scrap remained unchanged.

Chicago — Scrap continued to wait out a price increase. A few prices were inching up. Buyers were reporting increasing resistance in blast furnace, forge crops, some railroad items, some steelmaking grades. Chicago scrap men seemed to feel that whatever the inventory level might be among consumers, dealer yard inventories are down. A buyer coming in for a large tonnage may have to raise his price a bit.

Philadelphia—The more optimistic scrap dealers boosted buying prices—but elsewhere in trade circles it's doubted that prices will do any climbing. Mills just aren't buying heavily. Result is that dealers are working on a very slim profit margin. Bundles still fall in the same category as unwanted stepchildren. Consumer prices this week are unchanged.

New York—The trade now feels that prices have reached the bottom and that the only direction the market can go is up. There was a shade of firmness in the market this week although each broker contacted could report no real pickup in trading. The market was slow across the board. An increase in buying is expected late in the month.

Detroit — Increased strength was reported across the board, but there is a feeling of artificiality, particularly in primary grades. Higher prices were paid, but in some cases the consumer is already out of the market for the rest of the month. Reports are that brokers had some difficulty covering orders and that dealers are paying more for their scrap. All this is translated into upward price revisions.

Cleveland—Strength in this market emerged from the talking stage this week as No. 1 heavy melting went up $3 to $42 on the basis of a sale. Other steelmaking grades rose in sympathetic proportion. Turnings market also went bullish as machine shop turnings rose $3 to $25 and three blast furnace grades jumped $2 to $29 delivered. Low phos followed the upward swing with an increase of $4 to $47. Most trade observers explain that price increases are being pushed by a scarcity of dealer scrap.

Birmingham—There is still considerable dealer resistance to existing scrap prices, but some southern dealers are reportedly yielding. This does not mean any large amounts of scrap are being turned loose. Most of the better financed dealers are holding scrap. Mills apparently are in good shape and there is no particular pressure for the limited orders received. With not very much scrap moving, prices are remaining steady.

St. Louis — Only buying of the week was by one of the larger consumers and that was for a limited tonnage at present levels. Steel mills are said to have good inventories, and as vacation season approaches are avoiding taking on more supplies. Receipts are tapering off, as a result of low prices.

Cincinnati—Market showed definite signs of strength here as No. 1 steel moved up $1 to $40 delivered. No. 2 bundles also went $1 higher to $33. Buying is still limited and healthy mill inventories (45 to 60 days) promise to keep a lid on prices. Automotive scrap has been sold at the old OPS ceiling but package deals have not affected general price structure as much as they have in some other areas.

Boston — New England scrap dealers are rapidly regaining their optimism—prices didn't do any slipping this week. Cast grades remain very dull and it's almost impossible to find a buyer for No. 1 machinery cast.

West Coast—Shipment of small tonnages of bundles from Los Angeles to Geneva, Utah, last week reflected the clogged market conditions in Southern California. The No. 2 bundles were purchased at $20 in Los Angeles and despite the long haul were delivered at under the going rate at Salt Lake City of about $30 to $32.

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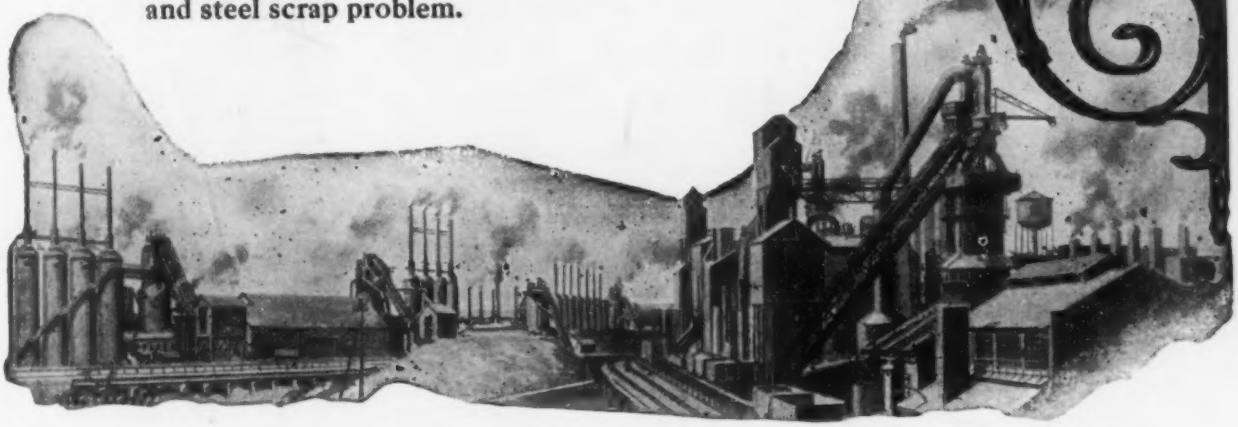

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CLEVELAND, OHIO NEW YORK, N. Y. SAN FRANCISCO, CAL.
SEATTLE, WASH.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Scrap Prices

(Effective June 9, 1953)

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	33.00 to 34.00
Machine shop turn	24.00 to 25.00
Mixed bor. and ms. turns.	24.00 to 25.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. punch'gs, plate	47.00 to 48.00
Heavy turnings	38.00 to 39.00
No. 1 RR. hvy. melting	46.00 to 47.00
Scrap rails, random lgth.	45.00 to 46.00
Rails 2 ft and under	51.00 to 52.00
RR. steel wheels	51.00 to 52.00
RR. spring steel	51.00 to 52.00
RR. couplers and knuckles	51.00 to 52.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	37.00 to 38.00
Malleable	44.00 to 45.00

Chicago

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 factory bundles	40.00 to 41.00
No. 1 dealers' bundles	38.00 to 39.00
No. 2 dealers' bundles	32.00 to 33.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	21.00 to 22.00
Low phos. forge crops	45.00 to 46.00
Low phos. punch'gs, plate	41.00 to 42.00
Low phos. 3 ft and under	42.00 to 43.00
No. 1 RR. hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	44.00 to 46.00
Rerolling rails	48.00 to 49.00
Rails 2 ft and under	50.00 to 51.00
Locomotive tires, cut	45.00 to 46.00
Cut bolsters & side frames	45.00 to 46.00
Angles and splice bars	46.00 to 48.00
RR. steel car axles	51.00 to 52.00
RR. couplers and knuckles	46.00 to 47.00
No. 1 machinery cast.	42.00 to 44.00
Cupola cast.	37.00 to 40.00
Heavy breakable cast.	32.00 to 33.00
Cast iron brake shoes	36.00 to 37.00
Cast iron car wheels	39.00 to 41.00
Malleable	38.00 to 40.00
Stove plate	32.00 to 33.00

Philadelphia Area

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	29.00 to 31.00
Machine shop turn.	26.00 to 27.00
Mixed bor., short turn.	30.00 to 31.00
Shoveling turnings	31.00 to 32.00
Clean cast chem. borings.	38.50 to 39.00
Low phos. 5 ft and under	43.50 to 44.50
Low phos. 2 ft and under	45.00 to 46.00
Low phos. punchings	45.50 to 46.50
Elec. furnace bundles	43.50 to 44.50
Heavy turnings	39.50 to 40.50
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
Rails 18 in. and under	55.00 to 56.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	41.00 to 42.00
Cast iron carwheels	46.00 to 47.00
Malleable	46.00 to 47.00
Unstripped motor blocks	28.00 to 29.00
No. 1 machinery cast.	47.00 to 48.00
Charging box cast.	39.00 to 41.00

Cleveland

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	36.00 to 37.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. 2 ft and under	46.00 to 47.00
Drop forge flashings	41.00 to 42.00
No. 1 RR. hvy. melting	47.00 to 48.00
Rails 3 ft and under	52.00 to 53.00
Rails 18 in. and under	52.00 to 53.00
Railroad grate bars	40.00 to 41.00
Steel axle turnings	38.00 to 39.00
Railroad cast	48.00 to 49.00
No. 1 machinery cast.	48.00 to 49.00
Stove plate	43.00 to 44.00
Malleable	48.00 to 49.00

Youngstown

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	34.00 to 35.00
Machine shop turn.	23.00 to 24.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Low phos. plate	46.00 to 47.00

Buffalo

No. 1 hvy. melting	$40.50 to $41.50
No. 2 hvy. melting	38.00 to 38.50
No. 1 busheling	40.50 to 41.50
No. 1 bundles	40.50 to 41.50
No. 2 bundles	36.00 to 36.50
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	27.00 to 28.00
Low phos. plate	44.00 to 45.00
Scrap rails, random lgth.	45.75 to 46.75
Rails 2 ft and under	51.75 to 52.75
RR. steel wheels	50.75 to 51.75
RR. spring steel	50.75 to 51.75
RR. couplers and knuckles	50.75 to 51.75
No. 1 machinery cast.	42.00 to 43.00
No. 1 cupola cast.	38.00 to 39.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles, openhearth	37.00 to 38.00
No. 2 bundles	24.00 to 25.00
Heavy turnings	27.00 to 28.00
New busheling	34.00 to 35.00
Drop forge flashings	34.00 to 35.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Electric furnace, bundles	37.00 to 38.00
Low phos. punch'gs, plate	37.00 to 38.00
No. 1 cupola cast	44.00
Heavy breakable cast.	36.00
Stove plate	36.00
Automotive cast.	44.00

St. Louis

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	32.00 to 33.00
No. 2 bundled sheets	29.00 to 30.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	17.00 to 19.00
Cast iron borings	11.00 to 13.00
Rails, random lengths	41.00 to 42.00
Rails 18 in. and under	49.00 to 51.00
Locomotive tires, uncut	43.00 to 44.00
Angles and splice bars	43.00 to 44.00
Std. steel car axles	46.00 to 48.00
RR. spring steel	43.00 to 44.00
Cupola cast.	39.00 to 41.00
Hvy. breakable cast.	30.00 to 32.00
Cast iron brake shoes	38.00 to 39.00
Stove plate	37.00 to 38.00
Cast iron car wheels	43.00 to 44.00
Malleable	35.00 to 36.00
Unstripped motor blocks	33.00 to 34.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	29.00 to 30.00
No. 2 bundles	27.00 to 28.00
Low phos. 2 ft and less.	37.00 to 38.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	21.50 to 22.50
Clean cast chem. borings	29.00 to 30.00
No. 1 machinery cast.	42.00 to 43.00
Mixed yard cast.	33.00 to 34.00
Charging box cast.	34.00 to 35.00
Heavy breakable cast.	34.00 to 35.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$29.50 to $30.50
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	29.50 to 30.50
No. 2 bundles	25.00 to 26.00
No. 1 busheling	29.50 to 30.50
Machine shop turn.	20.75 to 21.75
Shoveling turnings	22.75 to 23.75
Cast iron borings	22.75 to 23.75
Electric furnace bundles	32.00 to 33.00
Bar crops and plate	39.00 to 40.00
Structural and plate, 2 ft	36.00 to 37.00
No. 1 RR. hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	41.00 to 42.00
Rerolling rails	45.00 to 46.00
Rails, 18 in. and under	45.00 to 46.00
Angles & splice bars	45.00 to 46.00
Std. steel axles	45.00 to 46.00
No. 1 cupola cast.	38.00 to 39.00
Stove plate	34.00 to 35.00
Cast iron car wheels	46.00 to 47.00
Charging box cast.	30.00 to 31.00
Heavy breakable	30.00 to 31.00
Unstripped motor blocks	32.00 to 33.00
Mashed tin cans	17.00 to 18.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$30.75
No. 2 hvy. melting	$25.00 to 26.00
No. 1 bundles	30.25
No. 2 bundles	23.00 to 24.00
No. 1 busheling	29.00 to 31.00
Elec. furnace, 3 ft & under	33.25
Machine shop turn.	16.00 to 17.00
Mixed bor. and short turn.	20.00
Shoveling turnings	20.00 to 21.00
Clean cast chem. borings.	28.17
No. 1 machinery cast	30.00 to 31.00
Mixed cupola cast.	26.00 to 28.00
Heavy breakable cast.	27.00 to 29.00
Stove plate	26.00 to 27.00
Unstripped motor blocks.	22.00

Cincinnati

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Cash iron borings	20.00 to 21.00
Low phos. 18 in. & under	46.00 to 47.00
Rails, random lengths	42.00 to 43.00
Rails, 18 in. and under	50.00 to 51.00
No. 1 cupola cast.	41.00 to 42.00
Hvy. breakable cast.	37.00 to 38.00
Drop broken cast.	48.00 to 49.00

San Francisco

No. 1 hvy. melting	$28.00
No. 2 hvy. melting	24.00
No. 1 bundles	25.00
No. 2 bundles	22.00
No. 3 bundles	18.00
Machine shop turn.	10.00
Cast iron borings	15.00
No. 1 RR. hvy. melting	28.00
No. 1 cupola cast.	39.00

Los Angeles

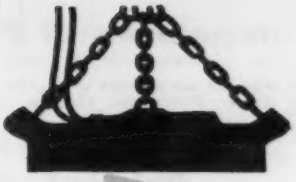
No. 1 hvy. melting	$24.00
No. 2 hvy. melting	20.00
No. 1 bundles	23.00
No. 2 bundles	20.00
No. 3 bundles	16.00
Mach. shop turn.	8.00
Shoveling turnings	12.00
Cast iron borings	12.00
Elec. fur. 1 ft and under	29.00
No. 1 RR. hvy. melting	24.00
No. 1 cupola cast.	$35.00 to 36.00

Seattle

No. 1 hvy. melting	$31.00
No. 2 hvy. melting	27.00
No. 1 bundles	28.00
No. 2 bundles	23.00
No. 1 cupola cast.	37.00
Mixed yard cast.	35.00

Hamilton Ont.

No. 1 hvy. melting	$32.00
No. 1 bundles	32.50
No. 2 bundles	32.00
Mechanical bundles	30.50
Mixed steel scrap	28.50
Bushelings	27.50
Bush., new fact. prep'd.	30.50
Bush., new fact. unprep'd.	29.50
Short steel turnings	26.50
Mixed bor. and turn.	26.50
Rails, remelting	32.50
Rails, rerolling	41.80
Cast scrap	50.00



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In slag reclamation or rough service—or any use where magnets are subjected to hard knocks—you need the extra heavy construction and greater lifting power of Ohio Magnets.

This super-strong Ohio Basket Magnet has an outer ring with integrally cast fenders that project beyond magnet diameter to ward off and protect against damaging blows. Extra heavy top plate is held in place with strong nickel-steel bolts.

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CHESTER BLAND
President

Comparison of Prices

(Effective June 9, 1953)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	June 9 1953	June 2 1953	May 12 1953	June 10 1952
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.775¢	3.775¢	3.775¢	3.60¢
Cold-rolled sheets	4.575	4.575	4.575	4.35
Galvanized sheets (10 ga)	5.075	5.075	5.075	4.80
Hot-rolled strip	3.725	3.725	3.725	3.50
Cold-rolled strip	5.20	5.20	5.20	4.75
Plate	3.90	3.90	3.90	3.70
Plates wrought iron	9.00	9.00	9.00	7.85
Stainl's C-R strip (No. 302)	39.75	39.75	39.75	36.75
Tin and Ternplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.70
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.40
Special coated mfg. ternes	7.75	7.75	7.75	7.50
Bars and Shapes: (per pound)				
Merchant bars	3.95¢	3.95¢	3.95¢	3.70¢
Cold finished bars	4.925	4.925	4.925	4.55
Alloy bars	4.675	4.675	4.675	4.30
Structural shapes	3.85	3.85	3.85	3.65
Stainless bars (No. 302)	34.00	34.00	34.00	31.50
Wrought iron bars	10.05	10.05	10.05	9.50
Wire: (per pound)				
Bright wire	5.225¢	5.225¢	5.225¢	4.85¢
Rails. (per 100 lb.)				
Heavy rails	$4.075	$4.075	$4.075	$3.60
Light rails	5.00	5.00	5.00	4.00
Semifinished Steel: (per net ton)				
Rerolling billets	$59.00	$59.00	$59.00	$56.00
Slabs, rerolling	59.00	59.00	59.00	56.00
Forging billets	70.50	70.50	70.50	66.00
Alloy blooms, billets, slabs	76.00	76.00	76.00	70.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.325¢	4.325¢	4.325¢	4.10¢
Skelp	3.55	3.55	3.55	3.35
Composite: (per pound)				
Finished steel base price	4.417¢	4.417¢	4.390¢	4.181¢

	June 9 1953	June 2 1953	May 12 1953	June 10 1952
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$60.69	$60.69	$60.69	$53.19
Foundry, Valley	55.00	55.00	55.00	52.50
Foundry, Southern, Cin'ti	58.93	58.93	58.93	55.50
Foundry, Birmingham	51.38	51.38	51.38	48.88
Foundry, Chicago†	55.00	55.00	55.00	52.50
Basic del'd Philadelphia	59.77	59.77	59.77	57.27
Basic, Valley furnace	54.50	54.50	54.50	52.00
Malleable, Chicago†	55.00	55.00	55.00	52.50
Malleable, Valley	55.00	55.00	55.00	52.50
Ferromanganese‡	229.78	226.99	226.99	186.25

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.

‡ Average of U. S. Prices quoted on Ferroalloy pages, 80 pct Mn basis.

Composite: (per gross ton)				
Pig iron	$55.26	$55.26	$55.26	$52.77
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$40.50	$38.50	$39.50	$43.00*
No. 1 steel, Phila. area	40.50	40.50	40.50	41.50*
No. 1 steel, Chicago	38.50	37.50	36.00	41.50*
No. 1 bundles, Detroit	37.50	36.50	36.50	41.15*
Low phos., Youngstown	46.50	46.50	47.50	46.50*
No. 1 mach'y cast, Pittsburgh	49.50	49.50	49.50	52.75
No. 1 mach'y cast, Philadel'a.	47.50	47.50	47.50	52.00*
No. 1 mach'y cast, Chicago	43.00	42.50	42.50	44.50

* Basing pt., less broker's fee. † Shipping pt., less broker's fee.

Delivered prices, including broker's fee, unless otherwise noted.

Composite: (per gross ton)				
No. 1 heavy melting scrap	$39.87	$38.87*	$38.67	$42.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.75
Foundry coke, prompt	17.25	17.25	17.25	17.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.875‡	29.875‡	29.875‡	24.50
Copper, Lake, Conn.	....	....	....	24.625
Tin, straits, New York	92.75†	95.00	96.50	$1.21½
Zinc, East St. Louis	11.00	11.00	11.00	16.00
Lead, St. Louis	13.05	13.05	12.30	14.80
Aluminum, virgin ingot	20.50	20.50	20.50	19.00
Nickel, electrolytic	63.08	63.08	63.08	59.58
Magnesium, ingot	27.00	27.00	27.00	24.50
Antimony, Laredo, Tex.	34.50	34.50	34.50	39.00

† Tentative. ‡ Average. * Revised.

Composite Price Notes

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Warehouse Price Notes

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1)500 to 1499 lb, (2)6000 lb or over, (3)450 to 1499 lb, (4)2000 to 3999 lb.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled A 4615 As Rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As Rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore	$.20	5.96–6.00	7.25–7.35	7.38	6.68	.....	6.55	6.59	6.56	7.64	.....	.....	.....	.....
Birmingham	.15	5.80	6.65	7.70[1]	5.80	.....	6.10	5.95	5.80	8.62	.....	.....	.....	.....
Boston	.20	6.66	7.54	8.39–8.93	6.81	.....	6.83–6.88	6.68	6.57	7.82	11.98	11.98	.....	14.23
Buffalo	.20	5.95	6.85	8.71	6.47	.....	6.38	6.20	6.05	7.15	.....	11.75–11.85	.....	14.15
Chicago	.20	5.95–5.96	6.82	7.75–7.90	6.10	.....	6.03–6.08	6.07	5.98	7.025	.....	11.45	.....	13.75
Cincinnati	.20	6.28	6.89	8.17	6.40	.....	6.55	6.54	6.28	7.38	.....	11.87	.....	14.17
Cleveland	.20	5.95–5.96	6.82–6.83	7.95–8.04	6.27	.....	6.25	6.40	6.04	7.10	.....	10.79–11.59	.....	12.79–13.89
Denver		7.70	9.15	10.25	7.60	.....	7.55	7.55	7.60	8.80	.....			
Detroit	.20	6.15–6.22	7.00–7.02	8.04–8.59	6.39–6.50	7.05–7.67	6.55	6.54–6.57	6.26–6.27	7.32	11.97	11.57–11.82	14.02	12.82–14.12
Houston	.20	6.75–6.89	7.00	8.62	6.95–7.16	.....	6.75–6.86	6.80–6.94	6.95–7.13	9.55	.....	12.65	.....	14.40
Kansas City	.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Los Angeles	.20	7.05	8.70	8.45–8.90	7.05–7.20	10.10–10.85	6.90	6.75–6.80	6.85–6.95	9.40–10.10	12.45–13.00	11.95–12.75	14.50–15.30	14.55–15.55
Memphis	.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Milwaukee	.20	6.12–6.13	6.99	7.92–8.47	6.27–6.28	.....	6.20–6.25	6.24	6.15	7.295–7.30	.....	11.62	.....	13.92
New Orleans	.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York	.30	6.54–6.77	7.45–7.59	8.72	6.72–6.82	.....	6.67	6.50	6.75	7.90	.....	11.84	.....	14.14
Norfolk	.20	6.75	.....	.....	7.00	.....	6.95	6.95	7.00	8.50	.....	.....	.....	.....
Philadelphia	.25	6.30	7.13–7.85	7.53–8.00	6.70	5.80	6.30	6.30	6.57–6.58	7.66	11.74	11.50	.....	13.89
Pittsburgh	.20	5.95–5.96	6.82	8.30	6.20–6.23	.....	6.03	6.07	5.98	7.12	.....	11.45	.....	13.75
Portland	.20	7.80	9.05	9.30	7.50	.....	7.05	7.25	7.25	9.40	.....	.....	.....	.....
Salt Lake City	.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco	.15	7.15	8.40	9.25–9.70	7.05–7.25	10.00	6.90	6.50–6.75	6.85	9.40–9.50	13.00	12.50–12.75	15.05	15.30–15.55
Seattle	.20	7.70–7.90	8.20–8.40	9.00–9.80	7.50–7.75	.....	7.05–7.28	6.70–6.97	7.07–7.27	9.54–9.74	.....	13.00	.....	15.30
St. Louis	.20	6.25	7.12–7.67	8.05	6.40	8.07–8.19	6.43–6.48	6.47	6.28	7.43	11.90	11.75	.....	14.05
St. Paul	.15	6.47	7.48	8.56	6.77	.....	6.69	6.73	6.64	7.78	.....	.....	.....	.....

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AT THE RIGHT: Standard "Apex" Carbide Tipped tools are being used by Southern Railway Systems for high-speed re-dressing of journals. These tools are made with ¾—⅛" radius both right and left.

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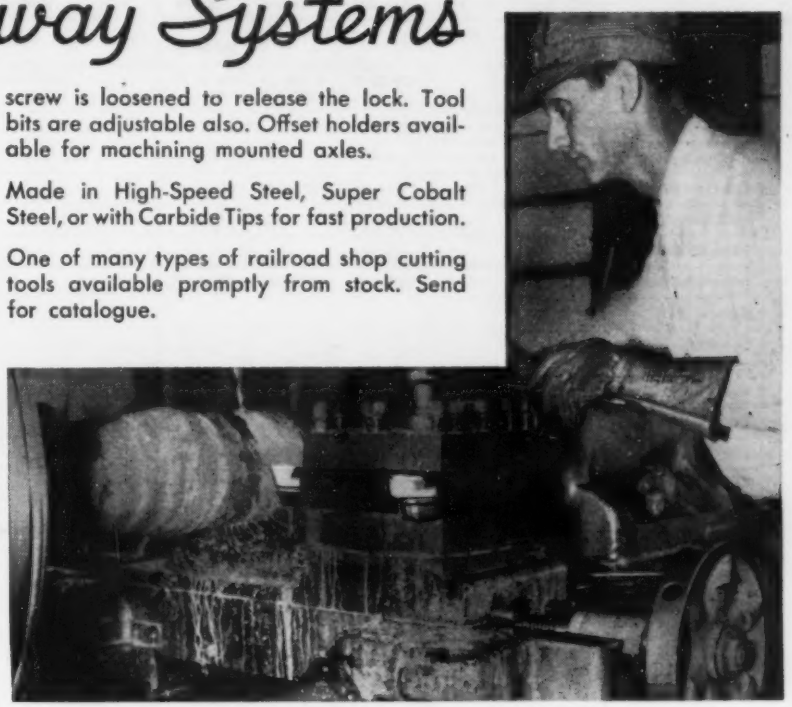

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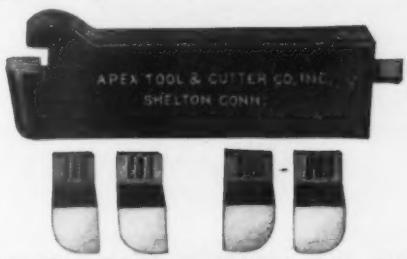

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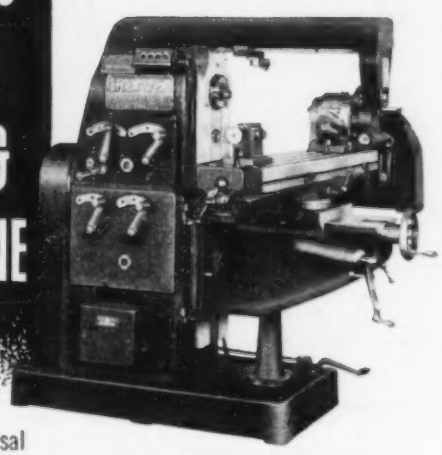

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STEEL PRICES

(Effective June 9, 1953)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PIL-ING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					$76.00 *B3*			3.90 *B3*	5.80 *B3*				
	Buffalo, N. Y.			$59.00 *B3*	$70.50 *B3, R3*	$76.00 *B3, R3*		4.675 *B3*	3.90 *B3*	5.80 *B3*	3.725 *B3, R3*	5.10 *B3*	5.70 *B3*	7.90 *B3*
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.				$77.50 *A2*	$83.00 *A2*					4.125 *A2*		5.90 *A2*	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			$59.00 *B3*	$70.50 *B3*	$76.00 *B3*			3.90 *B3*	5.80 *B3*	3.725 *B3*			
	Newark, N. J.													
	New Haven, Conn.											5.60 *A6* 5.85 *D1*		
	Phoenixville, Pa.								4.95 *P2*					
	Putnam, Conn.													
	Sparrows Pt., Md.										3.725 *B3*	5.10 *B3*	5.70 *B3*	7.90 *B3*
	Worcester, Mass.													
	Trenton, N. J.											6.45 *R4*		
MIDDLE WEST	Alton, Ill.										4.20 *L1*			
	Ashland, Ky.										3.725 *A7*			
	Canton-Massillon, Ohio				$70.50 *R3*	$76.00 *R3* $78.60 *T5*								
	Chicago, Sterling, Ill.			$59.00 *U1*	$70.50 *U1, R3, W8*	$76.00 *U1, R3, W8*		4.675 *U1*	3.85 *U1, W8*	5.80 *U1*	3.775 *A1, W8* 4.725 *N4*	5.35 *A1*		
	Cleveland, Ohio				$70.50 *R3*							5.10 *A5, J3*		7.45 *J3*
	Detroit, Mich.	$56.00 *R5*	$57.00 *R5*		$73.50 *R5*	$79.00 *R5*					4.025 *G3* 4.40 *M2*	5.30 *G3* 5.45 *M2* 5.60 *D1* 6.05 *D2*	6.30 *G3*	8.15 *G3*
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			$59.00 *U1*	$70.50 *U1*	$76.00 *U1, Y1*		4.675 *I3*	3.85 *I3, U1*	5.80 *I3, U1* 6.30 *Y1*	3.725 *I3, U1, Y1*	5.35 *I3*	5.65 *I3, U1* 6.15 *Y1*	
	Granite City, Ill.													
	Kokomo, Ind.													
	Middletown, Ohio											5.10 *A7*		
	Niles, Ohio Sharon, Pa.										4.225 *S1*	5.70 *T4* 5.80 *S1*	5.65 *S1*	7.30 *S1*
	Pittsburgh, Pa. Midland, Pa.	$54.00 *U1*	$57.00 *U1, C11*	$59.00 *U1*	$70.50 *U1*	$76.00 *U1, C11*	3.55 *U1* 3.65 *J3*	4.675 *U1*	3.85 *U1, J3*	5.80 *U1, J3*	3.725 *A7* 3.975 *A3* 4.225 *S7, S9*	5.10 *J3, A7* 5.45 *A3* 5.80 *B4, S7*	7.45 *J3*	
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.								4.10 *W3*		3.825 *W3*	5.10 *W3*	6.10 *W3*	7.95 *W3*
	Youngstown, Ohio					$76.00 *Y1, C10*	3.55 *U1* *R3*			6.30 *Y1*	3.725 *U1, Y1, R3*	5.10 *R3, Y1* 5.70 *C5* 5.80 *B4*	5.65 *R3, U1* 6.15 *Y1*	7.30 *R3* 7.80 *Y1*
WEST	Fontana, Cal.	$81.00 *K1*	$83.00 *K1*	$78.00 *K1*	$89.50 *K1*	$95.00 *K1*			4.50 *K1*	6.45 *K1*	5.175 *K1*	7.00 *K1*	6.75 *K1*	
	Geneva, Utah				$70.50 *C7*				3.85 *C7*	5.80 *C7*				
	Kansas City, Mo.								4.45 *S2*		4.325 *S2*			
	Los Angeles, Torrance, Cal.				$89.50 *B2*	$96.00 *B2*			4.45 *C7, B2*	6.35 *B2*	4.475 *C7, B2*	7.15 *C1*	6.40 *B2*	
	Minnequa, Colo.								4.30 *C6*		4.775 *C6*			
	San Francisco, Niles, Pittsburg, Cal.				$89.50 *B2*				4.40 *B2* 4.56 *P9*	6.30 *B2*	4.475 *C7, B2*		6.40 *B2*	
	Seattle, Wash.				$89.50 *B2, S11*	$96.00 *S11*			4.50 *B2*	6.40 *B2*	4.725 *B2*		6.65 *B2*	
SOUTH	Atlanta, Ga.										4.275 *A8*			
	Fairfield, Ala. Alabama City, Ala.			$59.00 *T2*	$70.50 *T2*				3.85 *T2, R3*	5.80 *T2*	3.725 *T2, R3*		5.65 *T2*	
	Houston, Texas		$65.00 *S2*		$78.50 *S2*	$84.00 *S2*			4.25 *S2*		4.125 *S2*			

STEEL PRICES

(Effective June 9, 1953)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
[illegible]-rolled [illegible] ga. hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 1.25-lb. base box	Holloware Enameling 29 ga.	
													Bethlehem, Pa.
[illegible]75 *B3*	4.575 *B3*				5.675 *B3*	6.925 *B3*							Buffalo, N. Y.
										† Special coated mfg terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb add 25¢. ELECTRO: 0.50-lb add 25¢; 0.75-lb add 65¢.			Claymont, Del.
													Coatesville, Pa.
[illegible]75 *A2*					5.925 *A2*								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.325 *B3*				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
													Putnam, Conn.
[illegible]75 *B3*	4.575 *B3*	5.075 *B3*			5.675 *B3*	6.925 *B3*	7.775 *B3*		4.425 *B3*	$8.80 *B3*	$7.50 *B3*		Sparrows Pt., Md.
									4.625 *A5*				Worcester, Mass.
									4.425 *R4*				Trenton, N. J.
									4.70 *L1*				Alton, Ill.
[illegible]75 *A7*		5.075 *A7*	4.925 *A7*										Ashland, Ky.
		5.075 *R3*											Canton-Massillon, Ohio
[illegible]75 *W8*					5.675 *U1*				4.325 *A5 N4,R3*				Chicago, Ill.
									4.425 *N4*				Sterling, Ill.
[illegible]75 *R3, J3*	4.575 *R3, J3*		4.925 *R3*		5.675 *R3, J3*	6.925 *R3, J3*			4.325 *A5*				Cleveland, Ohio
[illegible]975 *G3*	4.775 *G3*				6.225 *G3*	7.475 *G3*							Detroit, Mich.
													Duluth, Minn.
[illegible]75 *I3, U1,Y1*	4.575 *I3, U1,Y1*	5.075 *I3, U1*	4.925 *U1*	5.475 *U1*	5.675 *I3, U1* 6.175 *Y1*	6.925 *I3, U1* 7.425 *Y1*				$8.70 *U1, I3,Y1*	$7.40 *U1, I3*	6.10 *U1, Y1*	Gary, Ind. Harbor, Indiana
[illegible]30 *G2*	5.275 *G2*	5.275 *G2*	5.625 *G2*								$7.60 *G2*	6.30 *G2*	Granite City, Ill.
		5.475 *C9*											Kokomo, Ind.
	4.575 *A7*		4.925 *A7*	5.475 *A7*									Middletown, Ohio
[illegible]175 *S1*					5.675 *S1*						$7.40 *R3*		Niles, Ohio Sharon, Pa.
[illegible]775 *U1, J3,A7* [illegible]925 *A3*	4.575 *U1, J3,A7*	5.075 *U1*	4.925 *U1*		5.675 *U1, J3*	6.925 *U1, J3*	7.625 *U1*		4.325 *A5* 4.525 *P6*	$8.70 *U1, J3*	$7.40 *U1, J3*	6.10 *U1*	Pittsburgh, Pa. Midland, Pa.
									4.525 *P7*				Portsmouth, Ohio
[illegible]775 *W3, W5*	4.575 *W3, W5*	5.075 *W3, W5*		5.475 *W3, W5*	6.025 *W3*	7.275 *W3*				$8.70 *W3, W5*	$7.40 *W3, W5*	6.35 *W5*	Weirton, Wheeling, Follansbee, W. Va.
[illegible]775 *U1, R3,Y1*	4.575 *R3, Y1*	5.775 *R1*	4.925 *Y1*	6.05 *E2*	5.675 *R3, U1* 6.175 *Y1*	6.925 *R3* 7.425 *Y1*		5.65 *E2* 5.825 *R1*	4.325 *Y1*	$8.70 *R3*			Youngstown, Ohio
[illegible]825 *K1*	5.675 *K1*				6.775 *K1*	7.975 *K1*			5.125 *K1*				Fontana, Cal.
[illegible]875 *C7*													Geneva, Utah
													Kansas City, Mo.
[illegible]475 *C7*		5.825 *C7*						5.575 *C7*	5.125 *C7,B2*				Los Angeles, Torrance, Cal.
									4.575 *C6*				Minnequa, Colo.
[illegible]475 *C7*	5.525 *C7*	5.825 *C7*							4.975 *C7*	$9.45 *C7*	$8.15 *C7*		San Francisco, Niles, Pittsburg, Cal.
													Seattle, Wash.
													Atlanta, Ga.
[illegible]775 *T2, R3*	4.575 *T2*	5.075 *T2, R3*			5.675 *T2*			4.925 *R3*	4.325 *T2, R3*	$8.80 *T2*	$7.50 *T2*		Fairfield, Ala. Alabama City, Ala.
									4.725 *S2*				Houston, Texas

IRON AGE

STEEL PRICES

(Effective June 9, 1958)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'r's Bright
EAST	Bethlehem, Pa.				4.675 *B3*	6.00 *B3*	5.925 *B3*					
	Buffalo, N. Y.	3.95 *B3,R3*	3.95 *B3,R3*	4.975 *B5*	4.675 *B3,R3*	6.00 *B3,B5*	5.925 *B3*	3.90 *B3*			5.95 *B3*	
	Claymont, Del.							4.35 *C4*		5.35 *C4*		
	Coatesville, Pa.							4.35 *L4*		5.75 *L4*		
	Consbohocken, Pa.							4.35 *A2*	4.95 *A2*		6.20 *A2*	
	Harrisburg, Pa.							6.50 *C3*	6.50 *C3*			
	Hartford, Conn.			4.475 *R3*		6.45 *R3*						
	Johnstown, Pa.	3.95 *B3*	3.95 *B3*		4.675 *B3*		5.925 *B3*	3.90 *B3*		5.25 *B3*	5.95 *B3*	5.225 *B3*
	Newark, N. J.			5.375 *W10*		6.35 *W10*						
	New Haven, Conn.											
	Camden, N. J.			5.375 *P10*		6.35 *P10*						
	Putnam, Conn.			5.475 *W10*								
	Sparrows Pt., Md.		3.95 *B3*					3.90 *B3*		5.25 *B3*	5.95 *B3*	5.325 *B3*
	Worcester, Mass.					6.35 *A5*						5.525 *A5*
	Trenton, N. J.											
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.45 *L1*
	Ashland, Ky.							3.90 *A7*				
	Canton-Massillon, Ohio	3.95 *R3*		4.925 *R2,R3*	4.675 *R3* 4.72 *T5*	5.99 *T5* 6.00 *R2,R3*						
	Chicago, Ill.	3.95 *U1,W8, R3* 4.55 *N4*	3.95 *R3* 4.70 *N4*	4.925 *A5,B5 W8,W10*	4.675 *R3, U1, W8*	6.00 *B5,L2, R3,W8,W10* 6.05 *A5*		3.90 *U1,W8*	4.95 *U1*	5.25 *U1*	5.95 *U1*	5.225 *A5, N4,R3* 5.325 *K2* 5.475 *W7*
	Cleveland, Ohio	3.95 *R3*	3.95 *R3*	4.925 *A5,C13*		6.00 *C13* 6.05 *A5*	5.925 *R3*	3.90 *R3, J3*	4.95 *J3*		5.95 *R3, J3*	5.225 *A5, C13,R3*
	Detroit, Mich.	4.10 *R5* 4.30 *G3*		5.075 *R5,P8* 5.175 *P3* 5.125 *P5*	4.825 *R5* 5.025 *G3*	6.15 *R5,P8* 6.20 *P3,B5*	6.675 *G3*	4.45 *G3*			6.90 *G3*	
	Duluth, Minn.											5.225 *A5*
	Gary, Ind. Harbor, Crawfordsville, Indiana	3.95 *I3, U1, Y1*	3.95 *I3, U1, Y1*	4.925 *L2, M5,R3*	4.675 *I3, U1, Y1*	6.00 *L2,M5, R3,R5*	5.925 *I3, U1,* 6.425 *Y1*	3.90 *I3, U1, Y1*	4.95 *I3*	5.25 *U1*	5.95 *I3, U1,* 6.45 *Y1*	5.325 *M4*
	Granite City, Ill.							4.60 *G2*				
	Kokomo, Ind.											5.325 *C9*
	Sterling, Ill.		4.80 *N4*									5.325 *N4*
	Niles, Ohio Sharon, Pa.							4.15 *S1*		5.70 *S1*	5.95 *S1*	
	Pittsburgh, Pa. Midland, Pa.	3.95 *U1, J3*	3.95 *U1, J3*	4.925 *A5, J3, W10,R3,C8*	4.675 *U1, C11*	6.00 *C8,C11, W10* 6.05 *A5*	5.925 *U1, J3*	3.90 *U1, J3*	4.95 *U1*	5.25 *U1*	5.95 *U1, J3*	5.225 *A5, J3* 5.475 *P6*
	Portsmouth, Ohio											5.625 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.10 *W3*						3.90 *W5* 4.20 *W3*				
	Youngstown, Ohio	3.95 *U1, Y1, R3*	3.95 *U1, Y1, R3*	4.925 *F2, Y1*	4.675 *U1, C10, Y1*	6.00 *C10,F2, Y1*	5.925 *U1* 6.425 *Y1*	3.90 *U1, Y1, R3*			5.95 *R3* 6.45 *Y1*	5.225 *Y1*
WEST	Fontana, Cal.	4.65 *K1*	4.65 *K1*		5.725 *K1*		6.175 *K1*	4.55 *K1*		6.30 *K1*	6.65 *K1*	
	Geneva, Utah							3.90 *C7*			5.95 *C7*	
	Kansas City, Mo.	4.55 *S2*	4.55 *S2*		5.275 *S2*							5.825 *S1*
	Los Angeles, Torrance, Cal.	4.65 *C7,B2*	4.65 *C7,B2*	6.375 *R3*	5.725 *B2*		6.625 *B2*					6.175 *C7,B1*
	Minnequa, Colo.	4.40 *C6*	4.75 *C6*					4.70 *C6*				5.475 *C6*
	San Francisco, Niles, Pittsburg, Cal.	4.65 *C7,P9* 4.70 *B2*	4.65 *C7,P9* 4.70 *B2*				6.675 *B2*					6.175 *C6,C7*
	Seattle, Wash.	4.70 *B2,S11*	4.70 *B2,S11*		5.725 *S11*		6.675 *B2*	4.80 *B2*			6.85 *B2*	
SOUTH	Atlanta, Ga.	4.25 *A8*	4.25 *A8*									5.475 *A8*
	Fairfield, Ala. Alabama City, Ala.	3.95 *T2,R3*	3.95 *T2,R3*				5.925 *T2*	3.90 *T2,R3*			5.95 *T2*	5.225 *T2, R3*
	Houston, Texas Ft. Worth, Texas	4.35 *S2*	4.35 *S2* 5.05 *T7*		5.075 *S2*			4.30 *S2*				5.625 *S2*

Steel Prices

(Effective June 9, 1953)

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia-Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mills Co., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky

O1 Oliver Iron & Steel Co., Pittsburgh

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div. Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co. (John. A.), Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.
S11 Seidelhuber Steel Rolling Mills, Seattle

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Co., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh

Y1 Youngstown Sheet & Tube Co., Youngstown

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	Fence Posts Col	Single Loop Bale Ties Col	Twisted Barbless Wire Col	Galv. Barbed Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*†	127	133	...	143	...	148	6.375	6.775
Aliquippa, Pa. *J3*	126	136	...	...	...	145	6.375	6.90
Atlanta *A8*	130	140	...	135	...	149	6.325	6.675
Bartonville *K2*	127	139	140	132	148	148	6.075	6.50
Buffalo *W6*	...	...	...	...	...	...	...	...
Chicago *N4*	127	...	...	132	151	...	6.375	6.925
Cleveland *A6*	...	...	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	...	6.375	...
Crawfordsville *M4*	127	138	...	132	...	147	6.175	6.475
Donora, Pa. *A5*	127	133	...	132	142	148	6.375	6.775
Duluth *A5*	127	133	...	132	142	148	6.375	6.775
Fairfield, Ala. *T2*	127	133	...	132	142	148	6.375	6.775
Galveston *D4*	135	...	...	...	...	...	...	...
Houston *S2*	135	147	...	...	...	156	6.475	6.925
Johnstn., Pa. *B3*	127	...	148	...	149	...	6.375	6.925
Joliet, Ill. *A5*	127	133	...	132	142	148	6.375	6.775
Kokomo, Ind. *C9*	...	...	142	...	...	...	6.175	6.425
Los Angeles *B2*	...	...	...	...	...	...	7.025	...
Kansas City *S2*	139	...	...	144	...	160	6.075	7.125
Minnequa *C6*	132	146	138	137	...	153	6.325	6.70
Moline, Ill. *R3*	...	...	140	...	...	...	...	...
Pittsburg, Cal. *C7*	146	156	...	156	162	168	7.325	7.725
Monessen *P6*	127	138	...	...	147	147	6.075	6.45
Portsmouth *P7*	132	...	...	...	...	...	6.47	...
Rankin, Pa. *A5*	127	133	...	...	142	148	6.375	6.775
So. Chicago *R3*†	127	133	140	140	...	148	6.375	6.775
S. San Fran. Co.	...	...	...	153	...	167	7.025	7.40
Sparrows Pt. *B3*	129	...	...	134	151	...	6.475	7.025
Struthers, O. *Y1*‡	...	...	...	...	...	...	6.225	6.725
Torrance, Cal. *C7*	147	...	...	...	...	...	7.325	...
Worcester *A5*	133	...	...	...	...	...	6.675	7.075
Williamsport, Pa. *S10*	...	...	...	...	...	...	...	...

Cut Nails, carloads base $7.90 per 100 lb. (less 20¢ to jobbers) at Conshohocken, Pa. (*A2*), Wheeling, W. Va. (*W5*) $7.80.

† **Zinc extra not included on Galv. Merch. Wire.**

‡ **Struthers Galv. Merch. Wire based on 15¢ Zinc.**

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	15.50	16.50	18.00	17.50	26.75	21.75	23.50	13.50	16.25	13.75
Slabs, billets, rerolling	19.75	21.75	23.75	22.75	34.75	28.25	30.75	17.50	21.50	17.75
Forg. discs, die blocks, rings	36.75	37.00	39.75	38.50	57.25	43.50	48.25	30.00	30.50	30.50
Billets, forging	28.25	28.50	30.75	29.75	44.75	33.75	37.75	23.00	23.50	23.50
Bars, wires, structurals	33.75	34.00	36.50	35.50	53.00	40.00	44.75	27.50	28.00	28.00
Plates	35.75	35.75	38.00	38.00	56.00-56.25	44.00	49.00	28.75	29.75	29.25
Sheets	44.25	44.50	46.50	46.50	61.50	53.00	58.00	39.00	39.50	41.50
Strip, hot-rolled	28.50	30.50	35.00	32.75	52.50	40.00	44.50	25.00	32.75	25.75
Strip, cold-rolled	36.50	39.75	43.50	41.75	63.50	52.00	56.50	32.75	39.50	33.25

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2;* (type 316 add 4.5¢) *J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Lockport, N. Y., *R4.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S7;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2* (type 316 add 4.5¢); W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Lockport, N. Y., *S4;* Sharon, Pa., *S1* (type 301 all 1/4#); Butler, Pa., *A7;* Wallingford, Conn., *W1.*

Bars: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Lockport, N. Y., *S4;* Canton, O., *T5;* Ft. Wayne, *J4.*

Wires: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7:* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*

Plates: Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Lockport, N. Y., *S4;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11.*

WASHINGTON STEEL—Slightly lower on 300 series except where noted.

Miscellaneous Prices

(Effective June 9, 1958)

PIPE AND TUBING

Base discounts f.o.b. mills. Base price about $280 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	26.25	10.5	29.25	14.5	32.25	18.0	34.25	18.5	35.25	19.5	35.75	20.0	37.25	20.5								
Youngstown *R3*	28.75	12.5	31.75	16.5	34.25	20.0	36.75	21.0	37.25	22.0	37.75	22.5	39.25	22.5								
Fontana *K1*	15.75	+0.5	18.75	3.5	21.25	7.0	23.75	8.0	24.25	9.0	24.75	9.5	26.25	9.5								
Pittsburgh *J3*	28.75	12.5	31.75	16.5	34.25	20.0	36.75	21.0	37.25	22.0	37.75	22.5	39.25	22.5	18.25	2.5	22.25	5.0	24.75	7.50	26.25	9.0
Alton, Ill. *L1*	25.75	9.5	28.75	13.5	31.25	17.0	33.75	18.0	34.25	19.0	34.75	19.5	36.25	19.5								
Sharon *M3*	28.75	12.5	31.75	16.5	34.25	20.0	36.75	21.0	37.25	22.0	37.75	22.5	39.25	22.5								
Pittsburgh *N1*	28.75	12.5	31.75	16.5	34.25	20.0	36.75	21.0	37.25	22.0	37.75	22.5	39.25	22.5	18.25		22.25		24.75		26.25	
Wheeling *W5*	28.75	12.5	31.75	16.5	34.25	20.0	36.75	21.0	37.25	22.0	37.75	22.5	39.25	22.5								
Wheatland *W4*	28.75	12.5	31.75	16.5	34.25	20.0	36.75	21.0	37.25	22.0	37.75	22.5	39.25	22.5								
Youngstown *Y1*	28.75	12.5	31.75	16.5	34.25	20.0	36.75	21.0	37.25	22.0	37.75	22.5	39.25	22.5	18.25	2.5	22.25	5.0	24.75	7.50	26.25	9.0
Indiana Harbor *Y1*	27.75	11.5	30.75	15.5	33.25	19.0	35.75	20.0	36.25	21.0	36.75	21.5	38.25	21.5								
Lorain *Y2*	28.75	12.5	31.75	16.5	34.25	20.0	36.75	21.0	37.25	22.0	37.75	22.5	39.25	22.5	18.25	2.5	22.25	5.0	24.75	7.50	26.25	9.0
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	30.25	15.5	34.25	19.5	36.25	23.0	36.75	22.0	37.25	23.0	37.75	23.5	38.25	22.5								
Youngstown *R3*	32.25	17.5	36.25	21.5	38.25	25.0	38.75	24.0	39.25	25.0	39.75	25.5	40.25	24.5								
Fontana *K1*	19.25		23.25		25.25		25.75		26.25		26.75		27.25									
Pittsburgh *J3*	32.25	17.5	36.25	21.5	38.25	25.0	38.75	24.0	39.25	25.0	39.75	25.5	40.25	24.5	18.75	3.25	23.25	6.25	26.25	9.25	31.25	12.25
Alton, Ill. *L1*	29.25	14.5	33.25	18.5	35.25	22.0	35.75	21.0	36.25	22.0	36.75	22.5	37.25	21.5								
Sharon *M3*	32.25	17.5	36.25	21.5	38.25	25.0	38.75	24.0	39.25	25.0	39.75	25.5	40.25	24.5								
Pittsburgh *N1*	32.25	17.5	36.25	21.5	38.25	25.0	38.75	24.0	39.25	25.0	39.75	25.5	40.25	24.5	18.75		23.25		26.25		31.25	
Wheeling *W5*	32.25	17.5	36.25	21.5	38.25	25.0	38.75	24.0	39.25	25.0	39.75	25.5	40.25	24.5								
Wheatland *W4*	32.25	17.5	36.25	21.5	38.25	25.0	38.75	24.0	39.25	25.0	39.75	25.5	40.25	24.5								
Youngstown *Y1*	32.25	17.5	36.25	21.5	38.25	25.0	38.75	24.0	39.25	25.0	39.75	25.5	40.25	24.5	18.75	3.25	23.25	6.25	26.25	9.25	31.25	12.25
Indiana Harbor *Y1*	31.25	16.5	35.25	20.5	37.25	24.0	37.75	23.0	38.25	24.0	38.75	24.5	39.25	23.5								
Lorain *N2*	32.25	17.5	36.25	21.5	38.25	25.0	38.75	24.0	39.25	25.0	39.75	25.5	40.25	24.5	18.75	3.25	23.25	6.25	26.25	9.25	31.25	12.25

Galvanized discounts based on zinc, at 11¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 4½ pts. higher discount. Buttweld jobber's discount, 5 pct. East St. Louis zinc price now 11.0¢.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$16.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.95
Swedeland, Pa., f.o.b.	22.85
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.42
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, del'd	22.21
Lone Star, Tex., f.o.b.	18.50

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Meter	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beach Bottom *W5*	....	7.85	9.10	9.90	10.45	11.00	11.70
Brackenridge *A3*	7.35	7.85	9.10	9.90	10.45	11.00	11.70
Granite City *G2*	....	8.55	9.80	....	....	....	....
Ind. Harbor *I3*	7.35	7.85	9.10	....	....	....	....
Mansfield *E2*	7.35	7.85	9.10	9.90	....	....	....
Newport, Ky. *N5*	7.35	7.85	9.10	9.90	10.45	....	....
Niles, O. *N3*	7.35	7.85	....	....	....	....	....
Vandergrift *U1*	7.35	7.85	9.10	9.90	10.45	11.00	11.70
Warren, O. *R3*	7.35	7.85	9.10	....	....	....	....
Zanesville *A7*	7.35	7.85	9.10	9.90	10.45	11.00	11.70

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$110.30 to $113.30
6 to 24-in., del'd N.Y.	113.50 to 114.50
6 to 24-in., Birmington	96.50 to 101.00
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$128.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13	27.71	33.81	....	....
	2½	12	37.31	45.52	....	....
	3	12	30.66	37.41	....	....
	3½	11	50.29	61.35	....	....
	4	10	66.78	81.47	....	....
National Tube	2	13	....	31.29	22.73	....
	2½	12	34.54	42.14	31.19	....
	3	12	39.89	48.65	35.70	....
	3½	11	46.56	56.80	42.42	....
	4	10	61.83	75.42	53.85	....
Pittsburgh Steel	2	13	....	....	....	....
	2½	12	....	....	....	....
	3	12	....	....	....	....
	3½	11	....	....	....	....
	4	10	....	....	....	....

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery
Bethlehem *B3*	56.50	57.00	57.50	58.00	.....	.....
Birmingham *R3*	50.88	51.38	.....	.....	.....	.....
Birmingham *W9*	50.88	51.38	.....	.....	.....	.....
Birmingham *S9*	50.88	51.38	.....	.....	.....	.....
Buffalo *R3*	54.50	55.00	55.50	.....	.....	.....
Buffalo *H1*	54.50	55.00	55.50	.....	.....	66.75
Buffalo *W6*	54.50	55.00	55.50	.....	.....	.....
Chicago *I4*	54.50	55.00	55.00	55.50	.....	.....
Cleveland *A5*	54.50	55.00	55.00	55.50	59.50	.....
Cleveland *R3*	54.50	55.00	55.00	.....	.....	.....
Daingerfield, Tex. *L3*	50.50	51.00	51.00	.....	.....	.....
Duluth *I4*	54.50	55.00	55.00	55.50	.....	.....
Erie *I4*	54.50	55.00	55.00	55.50	.....	.....
Everett, Mass. *M6*	.....	59.50	60.00	.....	.....	.....
Fontana *K1*	60.50	61.00	.....	.....	.....	.....
Geneva, Utah *C7*	54.50	55.00	.....	.....	.....	.....
Granite City, Ill. *K3*	56.40	56.90	57.40	.....	.....	.....
Hubbard, Ohio *Y1*	54.50	55.00	55.00	.....	.....	.....
Jackson, Ohio *J1,G1*	.....	.....	.....	.....	.....	65.50
Minnequa *C6*	56.50	57.50	57.50	.....	.....	.....
Monessen *P6*	56.50	.....	.....	.....	.....	.....
Neville Island *P4*	54.50	55.00	55.00	55.50	.....	.....
Pittsburgh *U1*	54.50	.....	.....	55.50	.....	.....
Sharpsville *S3*	54.50	55.00	55.00	55.50	.....	.....
Steelton *B3*	56.50	57.00	57.50	58.00	62.50	.....
Swedeland *A2*	58.50	59.00	59.50	60.00	.....	.....
Toledo *I4*	54.50	55.00	55.00	55.50	.....	.....
Troy, N. Y. *R3*	56.50	57.00	57.50	58.00	62.50	.....
Youngstown *Y1*	54.50	55.00	55.00	55.50	.....	.....
N. Tonawanda, N. Y. *T1*	.....	55.00	55.50	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 and over. Silvery Iron: Add $1.50 per ton net for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT				
	0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn. *S7*	5.80	7.65	8.25	10.20	12.50
Carnegie, Pa. *S9*	.....	7.65	8.25	10.20	12.50
Cleveland *A5*	5.10	7.30	8.25	10.20	12.50
Detroit *D1*	6.45	7.50	8.10	.....	.....
New Castle, Pa. *B4*	5.80	7.65	8.25	.....	.....
New Haven, Conn. *D1*	6.70	7.60	8.20	.....	.....
Sharon, Pa. *S1*	5.80	7.65	8.25	10.20	12.50
Trenton, N. J. *R6*	.....	7.95	8.55	10.50	12.80
Warren, Ohio *T4*	6.20	7.65	8.25	10.20	12.50
Weirton, W. Va. *W3*	5.80	7.63	8.25	10.20	12.50
Worcester, Mass. *A5*	5.40	7.60	8.55	10.50	12.80
Youngstown *C5*	.....	7.65	8.25	10.20	12.50

* Sold on Pittsburgh base.

Miscellaneous Prices—

(Effective June 9, 1953)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.075	5.00	5.075	....	....	....	....
Chicago *R3*	....	....	....	6.65	....	....	....
Cleveland *R3*	....	....	....	....	....	....	....
Ensley *T2*	4.075	5.00	....	....	....	4.925	....
Fairfield *T2*	....	5.00	....	6.65	....	4.925	....
Gary *U1*	4.075	5.00	....	....	....	4.925	....
Ind. Harbor *I3*	4.075	....	5.075	6.80	....	4.925	....
Johnstown *B3*	....	4.55	....	....	....	....	....
Joliet *U1*	....	5.00	5.075	....	....	....	....
Kansas City *S2*	....	....	....	....	....	....	....
Lackawanna *B3*	4.075	4.55	5.075	....	....	4.925	....
Lebanon *B3*	....	....	....	6.65	....	....	....
Minnequa *C6*	4.075	5.05	5.075	6.80	....	4.925	10.00
Pittsburgh *R3*	....	....	....	....	....	....	....
Pittsburgh *O1*	....	....	....	....	....	....	....
Pittsburgh *P5*	....	....	....	....	....	....	....
Pittsburgh *J3*	....	....	....	6.65	....	....	....
Pitt'g, Cal. *C7*	....	....	....	....	....	5.075	....
Seattle *B2*	....	....	....	7.30	....	5.075	....
Steelton *B3*	4.075	....	5.075	....	....	4.925	....
Struthers *Y1*	....	....	....	6.65	....	....	....
Terrance *C7*	....	....	....	....	....	5.075	....
Youngstown *R3*	....	....	....	6.65	....	....	....

TOOL STEEL

F.o.b. mill

Add 4.7 pct to base and extras.

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
18	4	2	—	—	$1.65
1.5	4	1.5	8	—	31.0¢
6	4	2	6	—	96.5¢

High-carbon chromium	63.5¢
Oil hardened manganese	35¢
Special carbon	33.5¢
Extra carbon	27¢
Regular carbon	23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

Add 4.7 pct to base and extras.

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. *L4*	*29.5	
Washington, Pa. *J2*	*29.5	
Claymont, Del. *C4*	*29.50	
Conshohocken, Pa. *A2*		*27.50
New Castle, Ind. *I2*	*29.77	*26.24
Nickel-carbon		
10 pct. Coatesville, Pa. *L4*	32.5	
Inconel-carbon		
10 pct. Coatesville, Pa. *L4*	40.5	
Monel-carbon		
10 pct. Coatesville, Pa. *L4*	33.5	
No. 302 Stainless copper stainless, Carnegie, Pa. *A4*		77.00
Aluminized steel sheets, hot dip, Butler, Pa., *A7*		7.75

* Includes annealing and pickling, sandblasting.

ELECTRODES

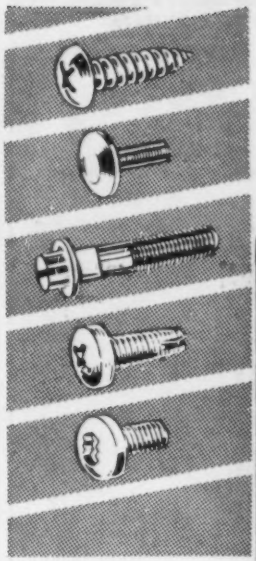
Cents per lb, f.o.b. plant threaded electrodes with nipples, unboxed

Diam. in In.	Length in In.	Cents Per lb.
	GRAPHITE	
24	84	18.70
17, 18, 20	60, 72	18.70
8 to 16	48, 60, 72	18.70
7	48, 60	20.50
6	48, 60	21.95
4, 5	40	22.53
3	40	23.68
2½	24, 30	24.36
2	24, 30	26.57
	CARBON	
40	100, 110	8.95
35	110	8.95
30	110	8.95
24	72 to 84	9.10
20	90	8.95
17	72	9.10
14	72	9.50
10, 12	60	10.30
8	60	10.55

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:

72½%	$44.00
70% or more	42.50
60% or less	38.00



KEYSTONE

"SPECIAL PROCESSED" COLD HEADING WIRE

Recommended for Your Difficult Cold Heading Jobs

The severe displacement of metal during the cold heading process requires wire that has been designed *specifically* to meet the requirements of your product. The following analysis of Keystone "Special Processed" Cold Heading Wire is recommended for difficult cold heading:

C1006 - C1012 for Clutch Heads
C1006 - C1022 for Phillips Heads
C1006 - C1022 for Struck Slot Heads
C1108 - C1109 for Phillips Head Wood Screws
C1035 - C1038 for Heat Treated Screws and Bolts

The excellent grain flow properties of this wire assures the desired upsetting and die forming qualities you need for greater efficiency in your particular operation.

INDUSTRIAL WIRE SPECIALISTS

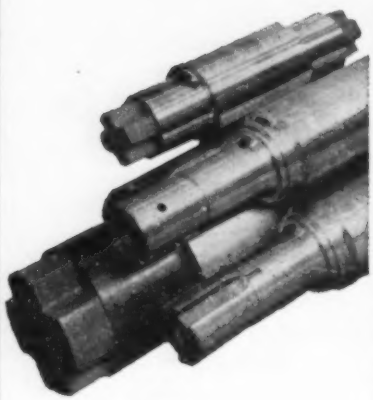
Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

Hyde Park

RED CIRCLE Rolls ALLOY-CHILLED

Red Circle Rolls for all Purposes

Hyde Park Red Circle Rolls are outstanding in quality and in performance and are easily identified by the Red Circle.



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finer finish
long life
greater tonnage
Specify Red Circle

Chilled Rolls
Alloy Iron Rolls
Moly Rolls
Nickel Chilled Rolls
Grain Rolls
Cold Rolls
Sand Rolls

Hyde Park

FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa.
ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

—Miscellaneous Prices—

(Effective June 9, 1953)

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

	Pct Off List			
	Less Keg Reg.	K.	Less Keg Hvy.	K.
½ in. & smaller.	10	24	10	24
9/16 in. & ⅝ in.	8	21	1	16
¾ in. to 1½ in. inclusive	4	18	+4	13
1⅝ in. & larger.	2	17	+4	13

Nuts, Hot Pressed—Hexagon

½ in. & smaller.	22	33	18	30
9/16 in. & ⅝ in.	13	25	1	16
¾ in. to 1½ in. inclusive	8	21	+3	13
1⅝ in. & larger.	4	18	+3	13

Nuts, Cold Punched—Hexagon

½ in. & smaller.	22	33	18	30
9/16 in. & ⅝ in.	19	31	13	26
¾ in. to 1½ in. inclusive	15	27	8	21
1⅝ in. & larger.	2	17	+4	13

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller.	33	43	26	37
9/16 in. & ⅝ in.	27	38	19	31
¾ in. to 1½ in. inclusive	21	33	11	25
1⅝ in. & larger.	6	19	net	15
	Light			
7/16 in. & smaller	33	43		
½ in. thru ⅝ in.	26	37		
¾ in. to 1½ in. inclusive	18	30		

Stove Bolts — *Pct Off List*

Packaged, steel, plain finished 44½—10
Packaged, plain finish ..... 25½—10
Bulk, plain finish** 59*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb
½ in. & larger	$8.50
	Pct Off List
7/16 in. and smaller	30

Cap and Set Screws

(In bulk)	*Pct Off List*
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	40
¾ in. thru 1 in. up to & including 6 in.	26
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	43
¾ in. thru 1 in. up to & including 6 in.	33
Milled studs	17
Flat head cap screws, listed sizes ...	12
Fillister head cap, listed sizes	7
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	37

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	11	25
9/16 in. & ⅝ in. x 6 in. & shorter	15	27
¾ in. & larger x 6 in. & shorter	14	26
All diam. longer than 6 in...	8	22
Lag, all diam. x 6 in. & shorter	19	31
Lag, all diam. longer than 6 in.	16	28
Plow bolts	30	..

Continuous Tooth

HERRINGBONE GEAR SPEED REDUCER

SINGLE •
DOUBLE •
TRIPLE •
REDUCTION

The GEAR with the Backbone •

Some Proven On-the-Job Advantages of This Type of Gear Reduction Are:

1. No side thrusts, avoidable deflections, distortions, impact stresses.
2. Stronger teeth, due to archlike construction.
3. Greater load carrying capacity.
4. More silent and smoother gear action.
5. Uniform load across face due to balanced thrusts of opposing helices.
6. Better lubrication, due to wedge action of teeth.
7. Overall design makes it less costly to produce.
8. Can be substituted for straight tooth gears.

We have extensive facilities for making Herringbone Gears, producing them from 1" to 60" in diameter, 16 DP to 1½ DP and up to a 20" face.

YOUR GEAR INQUIRIES WILL RECEIVE PROMPT ATTENTION FROM US.

SEND FOR CATALOG 40-C

ESTABLISHED 1888

D. O. James

D. O. JAMES GEAR MANUFACTURING CO.
1140 W. Monroe Street, Chicago 7, Ill.

Miscellaneous Prices

(Effective June 9, 1953)

REFRACTORIES

Fire Clay Brick	*Carloads, per* 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.25)	$99.30
No. 1 Ohio	92.40
Sec. quality, Pa., Md., Ky., Mo., Ill.	92.40
No. 2 Ohio	82.15
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.60)	14.40

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$99.30
Childs, Pa.	103.95
Hays, Pa.	105.10
Chicago District	122.40
Western Utah	116.55
California	122.85
Super Duty, Hays, Pa., Athens, Tex., Chicago	116.65
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	17.30
Silica cement, net ton, bulk, Hays, Pa.	19.60
Silica cement, net ton, bulk, Ensley, Ala.	18.45
Silica, cement, net ton, bulk, Chicago District	18.45
Silica cement, net ton, bulk, Utah and Calif.	25.95

Chrome Brick	*Per net ton*
Standard chemically bonded Balt., Chester	$86.00
Burned, Balt., Chester	80.00

Magnesite Brick	
Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite	*St. %-in. grains*
Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., in bulk	38.00
in sacks	43.70

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ $13.75

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices through June 30, 1953, delivery.

	Gross Ton
Openhearth lump	$10.95
Old range, bessemer	10.10
Old range, nonbessemer	9.95
Mesabi, bessemer	9.85
Mesabi, nonbessemer	9.70
High phosphorus	9.70

Prices based on upper Lake rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on Dec. 31, 1952. Increases or decreases after such date are for buyer's account.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	10.9¢
Canadian sponge iron, del'd. in East	12.0¢
Domestic sponge iron, 98+% Fe, carloads lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe	44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+%Fe	60.0¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	53.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb	.95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd	$3.50
Lead	21.75¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	33.5¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	83.9¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$5.50
Zinc, 10 ton lots	23.0¢ to 30.5¢

Portable HEAVY DUTY
P/S BAR RACKS

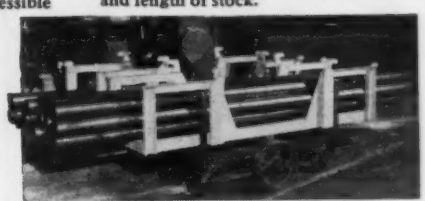
for quick convenient safe efficient storage

Item No. C-497

Handling and storage of steel shapes simplified for one-man operation. Using overhead crane for storage in tiers, rack selection is no problem. Design permits bar selection from any rack without disturbing tiers. Built to any capacity and length of stock.

Any rack easily accessible

Automatic Tong by HEPPENSTALL, Pittsburgh, Pa., for easy pick-up and safe carrying.



Easily placed on trucks for removal to machines not under crane.

When Ordering Always give "item" number; this will help prevent error.

Write for catalog.

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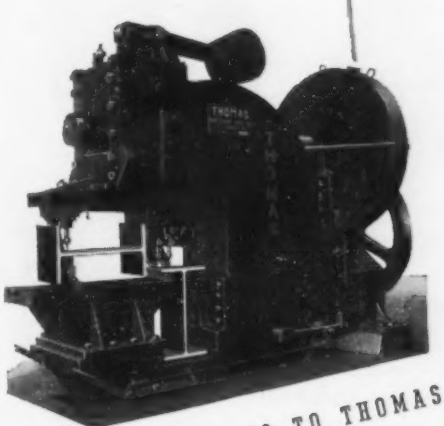
Palmer-Shile Co.
16005 FULLERTON AVE., DETROIT 27, MICH.

BEAM PUNCHING
without tool change



THE newly designed Thomas Beam Punches are built in sizes to handle beams up to 12"-18"-24"-30" and 36", web and flange punching, with a single tool set-up. Any of the five sizes may be used with or without a Thomas spacing Table, depending on production needs.

THE TREND IS TO THOMAS

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.

• Write for further information

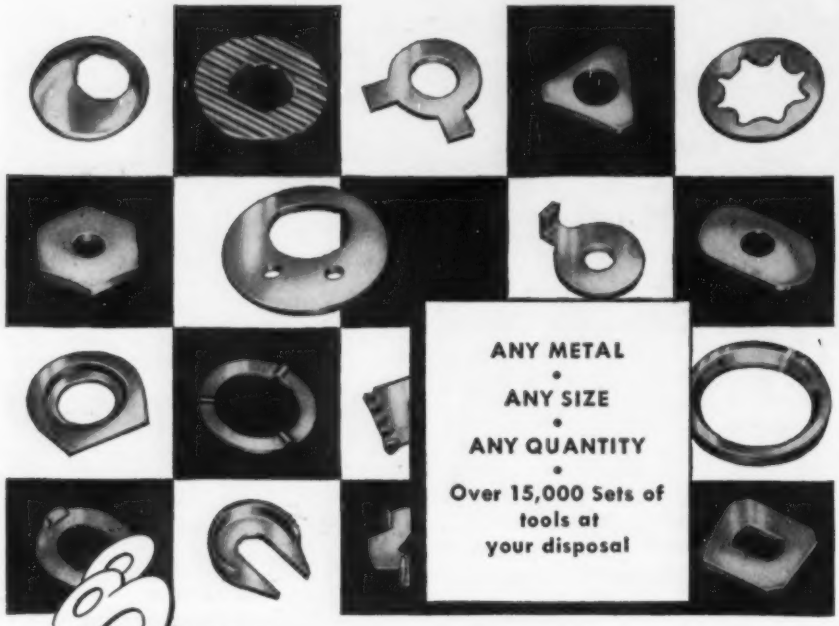
PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

51

IT'S A SMART MOVE TO ORDER

Special Washers

FROM A LEADER



THE Master Products CO.

6400 PARK AVENUE • Diamond 1-1740 • CLEVELAND 5, OHIO

ARMSTRONG *Drop Forged*

LATHE DOGS

ARMSTRONG Lathe Dogs give extra service because they are drop forged from selected open hearth steel, and are heat treated to extreme toughness and stiffness. Hubs are made large enough to permit re-tapping, screws are also of special analysis steel and are hardened at the point to prevent upsetting. ARMSTRONG Dogs come in 10 types with square head or safety headless screws, with straight or bent tails. They are carried in stock by your local ARMSTRONG Distributor.

Write for Catalog

ARMSTRONG BROS. TOOL CO.

5209 West Armstrong Ave., Chicago 30, Ill.

New York and San Francisco

Ferroalloy Prices

(Effective June 9, 1953)

Ferrochrome

Contract prices, cents per pound, contained CR, lump size, bulk in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C	34.50	0.20% C	33.50
0.10% C	34.00	0.50% C	33.25
0.15% C	33.75	1.00% C	33.00
2.00% C			32.75
65-69% Cr, 4-9% C			24.75
62-66% Cr, 4-6% C, 6-9% Si			25.50

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.18
0.50% max. C	1.14
9 to 11% C	1.11

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 25.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 25.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.

30-33% Cr, 60-65% Si, 3.00% max. Fe

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00
Ton lots to carload packed	19.00
Less ton lots	20.50

Ferromanganese

78 to 82 pct Mn base, maximum contract base price, gross ton, lump size, f.o.b. Niagara Falls, Alloy, W. Va.

Ashtabula, Ohio	$225
Philo, Ohio	225

Add or subtract $2.80 for each 1 pct Mn above or below base content.

74 to 76 pct Mn base, net ton, f.o.b.

Etna, Clairton, Pa.	$200
Johnstown, Pa.	200
Sheridan, Pa.	200

Add or subtract $2 for each 1 pct Mn above or below base.

Briquets—Cents per lb of briquet, delivered, 66 pct contained Mn.

Carload, bulk	12.50
Ton lots, packed	14.05

WW®

SEAM WELDING WHEELS

Seam welding wheels of any size are available in Weiger-Weed high strength, high conductivity alloys. To facilitate delivery, Weiger-Weed normally maintains a basic stock of many sizes of wheel blanks in finished form, or in rough form for user to finish machining. Generally, users find it more advantageous to order wheels completely finished.

We try to make wheel blanks available from stock for finishing to the following sizes:

Diameter:	7″	8″	8″	10″	10″	10″
Thickness:	⅜″	⅜″	½″	⅜″	½″	¾″

Other sizes available on request.

WHEELS ARE SUPPLIED IN WW-1, WW-2 AND WW-3 ALLOYS—(R.W.M.A. CLASSES 1, 2 AND 3)

22802A

WW WEIGER-WEED & CO., Division of Fansteel Metallurgical
Corp. • 11644 Cloverdale Avenue • Detroit 4, Michigan

Ferroalloy Prices

(Effective June 9, 1953)

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	30.00
Ton lots	32.00
Less ton lots	34.00 to 37.00
Premium for hydrogen-removed metal	1.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	28.45	30.30	31.50
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.40
Ton lots	13.05
Briquet contract basis carlots, bulk delivered, per lb of briquet	12.65
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $95.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00. Add $1.055 per ton for each additional 0.50% Si up to and including 17%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	18.00
97% Si, 1% Fe	18.50

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90.95% Si			17.00

Calcium Metal

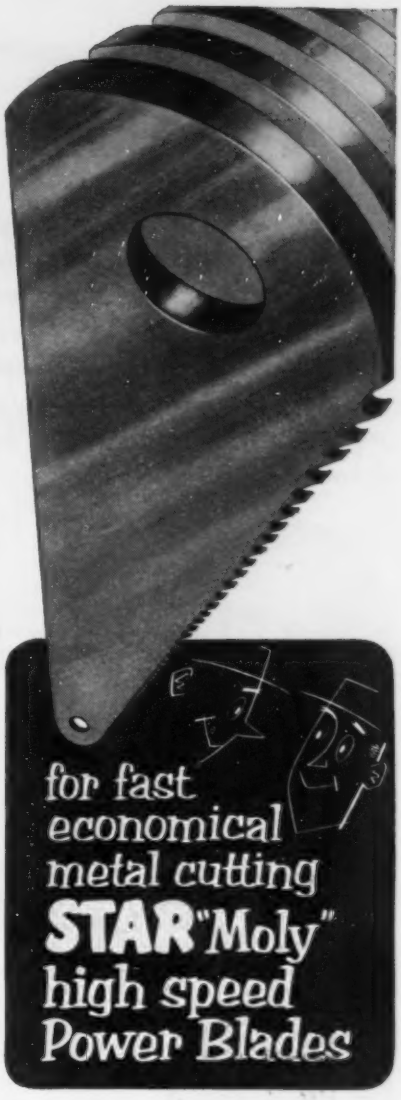
Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25



For over 70 years, industry has preferred STAR quality, preferred the blades made of carefully heat-treated, top-quality steel, fabricated on specially designed equipment—all for the sole purpose of delivering fast, economical metal cutting and long blade life.

FOR FAST, ECONOMICAL
Service

STAR Blades are sold only through recognized distributors. You get *fast* service from local distributors' inventories. You get *economical* service because your distributor knows your operations best, he is easy to reach, he is trained by qualified factory representatives to know the answers to your metal cutting—and hundreds of other—problems.

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MIDDLETOWN, N. Y., U.S.A.
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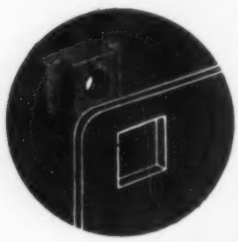
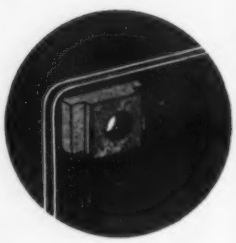
FABRI-STEEL "Fast On" clinch nuts increase thread area and use of lighter gage metal. They cut assembly, using shorter screws and speeding up assembly. Our engineers can help you improve your product. Send for detailed data sheets.



1
The square shape simplifies installation.

2
The small square portion is inserted and protrudes through the square hole that has been previously punched.



3
The protruding portion is now clinched at 4 corners with swaging tool.

4
Nut cannot work loose and variation in thickness of metal is taken care of automatically.

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Automobiles	Farm Equipment
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Appliances	Ordnance Equipment

FabriSteel

PRODUCTS INCORPORATED

BOX 4745-1B • DETROIT, MICHIGAN

Phone KEnwood 2-1380

Ferroalloy Prices

(Effective June 9, 1953)

Aisifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carloads 9.90
Ton lots 11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60% 2 in. x D contract basis, delivered per pound contained Cb.
Ton lots $4.90
Less ton lots 4.95

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30% C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload..... $75.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b. $4.45

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium Pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.21

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 7.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B... $5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound.... 50¢

Corbortam, Ti 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots.... $1.20
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B..... .85
14 to 10% B..... 1.20
19% min. B..... 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 68¢
No. 79 ..... 50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots $1.46
Less ton lots 1.57

Nickel - Boron, 15-18%, B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered
Less ton lots..... $1.30

Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢

"New Process"

Punches • Dies • Rivet Sets

Compression Riveter Dies

Made to highest standards and uniform quality thus insuring maximum service—
Since 1903

Large inventory of stock sizes of round punches and dies, also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.

Write Dept. B for catalog 46

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...because (1) Good sound castings mean minimum rejects, and the saving of time and money wasted in useless finishing and assembly work.

(2) Real accuracy, means closeness to designs and specifications; therefore, less machinery and finishing costs.

(3) Quick and courteous service means less follow-up time and annoyance on customers' part,—and of course, more prompt deliveries to our customers' customers.

Proof of AMB Quality and Service may be readily obtained from our customers.

Note: Our new, flat opening, flexible-bound "Reference Book on Bronze Casting Alloys" has just come off the press — Copy will be sent upon request on your Business Letterhead.

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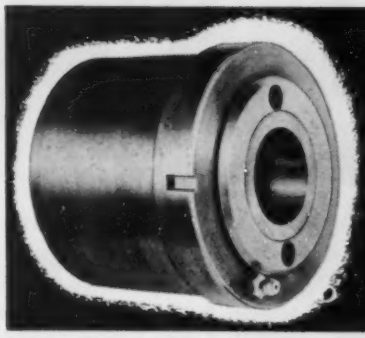
Established 1909



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PREVENTS COOLANTS AND GRIT ENTERING BEARING CAVITY

For the first time in the industry — a Pilot Bearing Bushing with absolute seal against the abrasive action of dust, coolants and grit. Actually the entry of abrasive materials into the outer seal of the bushing simply increases the effectiveness of the seal. In addition Jergens Pilot Bearing Bushings provide greater bearing accuracy and bushing stability. Submit your toughest applications — see how Jergens can save you money.

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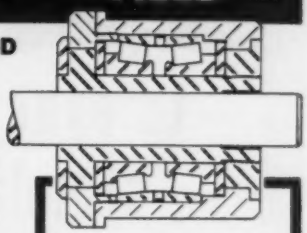

Provides absolute seal.

Can be dissembled without removing housing.

Cartridge-type holder gives greater accuracy.

Protects against thrust and radial loads. Tapered bearings adjustable for wear compensation.

Adaptable to receive removable slip bushings, keys or keyways.

Can be furnished with shafts to use as pressure rolls.

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3-H.P. line—wet and dry cutting, bevel or rt. angle. Capacity: ¾" solids; 2" tubing; 2" x 6" lt. sheet formed sections; ½" x 1" flats.

10-H.P. line—wet cutting, rt. angle or bevel. Capacity: 2½" solids; 3" x ⅜" angles; 4½" tubing; ¾' x 3" flats. Write for literature. Specify shape, size and material to be cut.

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BROWNING ELECTRIC TRAVELING CRANES AND HOISTS
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good machinery

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to exacting standards

18" x 54" centers MONARCH Lathe, motor in base, taper attachment, chucks
27" x 12' centers LODGE & SHIPLEY Selective Geared Head Lathe, AC-MD
28" x 15' centers BERTRAM (Niles patterns) Timesaver Engine Lathe, 2 carriages, rapid traverse, AC-MD, 1943
36" x 12' centers AMERICAN Heavy Duty 16 Speed Geared Head Lathe, AC-MD
42" x 96" centers NILES Timesaver Heavy Duty Lathe, 42" swing over ways, rapid traverse, anti-friction head, AC-MD
60" x 20' NILES BEMENT POND Geared Head Engine Lathe, rapid traverse
No. 3A WARNER & SWASEY Turret Lathe, 6¼" hole in spindle, bar feed, chuck, tooling, new 1942
62" BULLARD Vertical Boring Mill, 2 swivel rail heads, power rapid traverse, AC-MD
100" NILES Heavy Duty Vertical Boring Mill, 2 swivel heads, rapid traverse, AC-MD
No. 3-24 CINCINNATI Plain Hydromatic Mill, AC-MD
No. 4 KEARNEY & TRECKER Plain Horizontal Mill, No. 50 taper, motor in base, rapid traverse
No. 4 CINCINNATI High Power Vertical Mill, No. 50 taper, power rapid traverse, AC motor
No. 4H KEARNEY & TRECKER Vertical Mill, new 1944
5" bar KEYSTONE Universal Horizontal Boring & Drilling Machine
25A HEALD Rotary Surface Grinder, 24" diameter magnetic chuck, AC-MD
No. 6G SELLERS Drill Grinder, new 1941
36" OHIO Heavy Duty V Ram Shaper, new 1944, AC-MD
1½" LANDIS Bolt Threader, leadscrews, AC-MD
75 Ton HENRY & WRIGHT Double Crank Dieing Machine, roll feed & scrap cutter
600 Ton CHAMBERSBURG Wheel Press, cast steel frame, inclined, AC-MD
30" MORTON, Hydraulic Keyseater, new 1942
Type "D" BARBER COLMAN Gear Hobber, new 1945, practically new
No. 9A MARVEL Hacksaw, 10" x 10" capacity, bar feed, AC-MD
48" x 48" x 10' NILES Double Housing Planer, 2 rail heads, 1 side head, power rapid traverse

O'Connell
MACHINERY CO.
of BUFFALO, n. y.
1693 GENESEE ST.

The Clearing House

NEWS OF USED AND REBUILT MACHINERY

Slide Slows . . . Estimates of business volume in the Midwest this month ranged from "good" to "better". It would appear that sliding demand for used machine tools has begun to level off. There was growing strength in moves to bring inventories up to date and to increase stocks of late model machine tools. With these newer units becoming increasingly available, interest in auctions has begun to pick up.

Demand continues good in sheet metalworking equipment, but small shop demand for general purpose lathes is beginning to strengthen slightly.

Will Pick Up . . . In electrical machinery lines, heavy equipment seems to have the edge in sales, but this is regarded as a temporary situation. The market for lighter equipment is expected to pick up before the end of the year.

While most dealers have been paring inventories in the past few months, some of this caution appears to have dissipated. A number of dealers feel that they can now beef up their in-shop stocks. This is another factor that has caused an increased interest in auctions.

Costs Too Much . . . A particularly troublesome problem for used machine tool men has been freight costs. With used machine tools rated as a Class I item on freight rate schedules, an ancient vintage used machine tool may cost as much to move as a brand new model that will net several times the price of the used tool. But for both, the freight cost will remain much the same. It is common to hear the freight cost problem referred to as a virtual "embargo" by used machine tool dealers who have been shipping into the West and South.

In recent years a number of dealers have come to regard the industrially expanding South as an excellent potential market for used machine tools. While no figures have been made available, it is commonly understood that shipments into the South have been on the increase since the war.

Revise Rates . . . While a used machine tool continues to be a good buy, nonetheless it is felt that the going ratio between the price of a used machine tool and the cost of shipping them needs revision.

The most active attempt to do something about this problem is the Machinery Dealers National Assn.'s survey of freight costs. While MDNA is not saying a great deal about the survey until the results are in, preliminary indications are that the survey will cover a comprehensive sample of the business and will clearly show the ratio between tool weight and cost of moving it.

Backlogs Chopped . . . Tool rebuilding continues at a good pace, though the backlogs that once accumulated due to lack of spare parts, difficulty of obtaining certain high alloys and high heat-treat steels, have pretty much disappeared.

Defense work among rebuilders, a very strong item during the tooling for the aircraft and shell programs has dropped considerably. Some work is still being done on shell lathes, but this is regarded as pretty much a thing of the past.

More for Reserve . . . Aircraft cutbacks have again made machine tools available to the government tool reserve, with the result that government tools are being shipped from idle plants to other government plants that may need them. The same holds true for the Army Ordnance programs. On the other hand, the current wave of industrial expansion has meant more business for both used machine tool dealers and rebuilders, and has offset defense losses to a considerable extent.